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THE AMERICAN

JOURNAL OF PHARMACY

APRIL, 1920

EDITORIAL.

THE INSUFFICIENCY OF PHARMACEUTICAL EDUCATION.

Nearly one hundred years have elapsed since the first school of pharmacy was established in America. In this initial systematic effort to educate pharmacists a course of two years, consisting of lectures on materia medica and chemistry, was the original conception of the special education necessary for the would-be druggist. A practical experience of four years in a drug store was then, as now, considered by those engaged in the calling as essential to complete the equipment and training necessary for an apothecary. During this time, the student by faithful application to his studies and store duties was presumed to have acquired the requisite scientific knowledge and professional skill and to have become proficient in the art and practice of pharmacy.

In those early days, little or no attention was paid to the preliminary education of the would-be pharmacist. Yet as one studies the history of those who were active in pharmacy during this period, he is convinced that many of these were men of high attainments and great ability and exceptionally well educated for the time in the sciences and languages. The thoughtfulness of parents in selecting vocations for their sons coupled with the scientific and professional associations of the apothecary, it would seem had attracted many of the young men with scientific propensities.

For many years the colleges of pharmacy did not deem it necessary to require of their matriculants any standard or grade of preliminary education. Reliance upon the final examinations to weed out the undesirables and incompetents seems to have been the only method considered expedient. With the changes of time, the ideals have been elevated and from time to time the preliminary education re-

quired of those entering schools of pharmacy has been advanced and in the near future all students admitted to the recognized schools of pharmacy in the United States will have had at least a preliminary education, the equivalent of a standard four years' high school course.

The American Conference of Pharmaceutical Faculties has been a potent factor in determining that prerequisite education was an initial step that must be taken to establish pharmacy on a professional basis. A number of the states now require by enactment that those licensed to practice pharmacy must be graduates from approved schools of pharmacy and prior to such pharmaceutical education shall have had a standard fundamental education. It is imperative that such laws should be enacted in every state so that prerequisite education for pharmacists will be a universal requirement in the United States.

The claim that this would work a hardship cannot be maintained as throughout the United States opportunity is now afforded, through the public school system, for every youth to acquire at least a high school education. When the first school of pharmacy was established, and for some years thereafter, it was the exceptional boy or girl who had the opportunity of attending high school, but now this is the common privilege of all.

While pharmaceutic educators have been making strenuous efforts to provide for a fundamental education, they have not paid the attention deserved to the necessity for a more thorough training of their graduates. With the great advances made in the medical profession and the constant additions to our materia medica and the progress of the sciences, the knowledge required of the pharmacist is necessarily many times that expected a century ago. The colleges have endeavored to supply this extended knowledge by establishing chairs and instructions in many branches of science that were never dreamed of as essential to pharmacy in the earlier decades of pharmaceutical education in America. Pharmacognosy, bacteriology, clinical and pathological chemistry and pharmacodynamic assaying and commercial training are only some of the courses that have been introduced into the collegiate education and many of these are included in the courses outlined in the Pharmaceutical Syllabus.

Despite the fact that these added courses mean many hours of additional study and application and likewise that the commercial aspect of pharmacy must receive increased attention from the students, the colleges are still attempting to impart the fundamental

knowledge required of the pharmacist in a course of two years. Under the conditions existing it is apparent that this becomes an effort in which both the teachers and the students are endeavoring to accomplish in a period of two years, what, if accomplished in a period of four years, would be very creditable and more satisfactory.

The attempt to give in a two-year course an ample foundation for the practice of pharmacy is a serious defect in our present system of pharmaceutical education. The average student gets a confused and unsatisfactory education in the time allotted and it is not to be wondered at that his future career is devoted more to the commercial than to the professional aspect of his calling.

The first duty of the educators is to make good, practical, well-equipped pharmacists. Ideals of pharmacy must be based upon a thorough foundation and if pharmacy is to be developed into the professional status we are hoping and working for, it will be necessary that the majority of those engaged in the calling shall have a thorough education and be fittingly prepared for professional careers.

The student who takes up post-graduate studies and fits himself to carry on the higher professional duties of analyst or expert in pharmacognosy or bacteriology is the exception, and this limited number cannot establish a professional status for the entire body engaged in the calling of pharmacy.

The time that should be required by the average student to perfect himself in the theoretical education of a pharmacist and likewise in the commercial training must be greatly extended if we expect to have a sufficient amount of knowledge absorbed by the entire body pharmaceutic to claim professional status.

The need for extending the time required for obtaining a professional education has been recognized by medicine, law and theology and in fact by practically every other profession than pharmacy. For some reason the pharmacy schools have continued in their attempt to educate professional pharmacists in a course of two years. The necessity for greatly extending the time devoted for the education of students in pharmacy is so apparent that the directing of the attention of educators thereto should be unnecessary.

To obtain the professional rank we desire to secure for pharmacy, the future graduate must be better equipped, and this can only be accomplished by extending the time devoted to the ever-increasing studies. The time is certainly at hand when the *fundamental course*

for the training of pharmacists should be extended to at least three years of collegiate education. G. M. B.

CALCREOSE PROTECTED BY UNITED STATES PATENT.

In the January number we republished from *The Prescriber* of December, 1919, an article on calcium-creosote. In this reference was made to Calcreose, and a formula for the preparation of a similar compound in liquid form given in the *Pharmaceutical Journal*, was republished.

We are in receipt of a communication from the Maltbie Chemical Company, of Newark, New Jersey, in which we are advised that the process for making Calcreose is patented, and that no one can make an imitation without infringing upon their patent.

We republished this paper as a contribution to the knowledge of the use of creosote as a remedial agent and the fact that Calcreose was protected by process patents entirely escaped our consideration.

It is not the purpose of the AMERICAN JOURNAL OF PHARMACY to submit to our readers the possibilities of imitating a patent-protected commercial article, nor have we intended in any way at any time to condone substitution or any other unfair practice in dispensing. On the contrary, the JOURNAL has always maintained the position that it was plainly the duty of the pharmacist to dispense the original proprietary or patented articles in all cases where such are prescribed, and the manufacturers of Calcreose have our assurance that it was not our purpose to suggest any substitution for Calcreose.

We have not read the patent specifications in which the claim for novelty of invention or discovery is set forth, and we are not prepared to express our opinion as to the similarity of the liquid preparation yielded by the formula from the *Pharmaceutical Journal* to the powdered product described in the article as Calcreose.

That creosote is a mixture of phenols and phenol derivatives obtained by the distillation of wood tar is asserted by the United States Pharmacopoeia. The phenolic character of guaiacol and creosol, the chief constituents of official creosote, is well established, and it has long been a matter of common knowledge that phenols as a class unite with basic elements such as potassium, sodium and *calcium*, and that the presence of water facilitates the formation of such compounds. Under these circumstances, the defense of such

a patent as a novel or original invention might become an interesting problem. G. M. B.

AMERICAN PHARMACEUTICAL ASSOCIATION MEETING.

By L. F. Kebler, Chairman Publicity,

Washington, D. C., May 5 to 10, 1920.

Everybody wants to see Washington. During the recent Titanic War the eyes of the entire world were turned to the United States and since its termination Washington easily holds first place in the universe. The mecca of the world is Washington. It is the hope and ambition of every good citizen of our great country to see his National Capital at least once. There is more here than can be seen and learned in weeks of sightseeing and study. We have things in Washington that will fascinate any one from the most profound scientist or astute statesman, to the merry sightseers. Our beautiful city and the internal workings of the greatest government on earth fascinate and properly so, all comers. Hotel accommodations are among the best.

Of all the months May is the most charming. It is then that the new, fresh foliage of numerous and rare trees will overhang our broad and well-paved streets. The many parks and parklets, with native and exotic plants, will be in their best attire. The animals in our charming, rolling Zoölogical Park will bring joy and pleasure to all lovers of nature. It is the time of year when life is bubbling over. Everything will be all activity. The rugged, scenic, Great Falls of the Potomac are but 20 miles away. The ladies have planned a trip to this beautiful spot.

In Washington can be seen the numerous and beautiful, massive Government buildings of Doric, Ionic and Gothic architecture. Next May will be the best time to see and learn how the government business is carried on. Congress will be in session. You should spend several days at the Capitol and see how the Senate and House conduct the nation's business. Trips should be taken to the White House, the Congressional Library, Pan-American Building, D. A. R.

Hall, Washington Monument, Lincoln's Memorial, National Museum, Smithsonian Institution, Zoölogical Garden, Botanical Gardens, Bureau of Printing and Engraving, Corcoran Art Gallery, Fish Commission, Government Printing Office, Lee's Mansion, etc. Provisions are made to take all the visitors to Mt. Vernon enroute to the Shad Bake.

The local committee is prepared to give every possible assistance and aid in planning so that you can see and learn the greatest amount in the shortest possible time. There will be some one at the Union Station, properly badged, to meet you, If you should be missed apply at the Traveler's Aid Booth, in the center of the building, for information. There is only one railroad station in Washington and that is considered the best in the world, by many. Its main concourse will accommodate 50,000 people. On arriving in Washington go directly to headquarters, The New Willard Hotel, for registration and information. Cars passing in front of the station marked "Georgetown" or "14th" and some other street will take you to headquarters.

1820—A BIT OF HISTORY.*

By J. W. Sturmer, Phar.D.

There is no periodicity in the great events which mark the march of human progress. Only happenings correlated to the seasons keep step with the calendar. And when history repeats itself—which it never does except with variations—even numbers of years, or odd numbers, or decimal multiples, have no special significance—of course not.

But it is true that the year 1820 was in many respects like the present—1920. The chronicles of that early period seem strangely modern. We find references to high prices, labor disturbances, to unstable equilibrium in business affairs, political unrest, and evidence, in Europe particularly, of that abnormal attitude of mind which in our time has led to overt acts on a large scale, and which has received a Russian name. The fact is, after a hundred years Europe and America, both, again are passing through a period of convalescence following the exhausting distemper, war. In 1820,

* Extracts from an address before Philadelphia Branch, A. Ph. A., at the January meeting.

as at present, Europe was battle-scarred, then as a result of the campaigns of Napoleon. America was battle-scarred, too, for the burning of Washington and the victory of New Orleans were still discussed as recent happenings. Men had gone to war; some had not returned. Many industries had been ruined. Certainly America in 1920 can realize the conditions which obtained a hundred years ago. In 1914 America could not have done so.

But despite conditions seemingly so unfavorable, the period of 1820 marks a glorious renaissance in science and art. In literature, during the war period, or immediately thereafter, Moore, Shelley, Wordsworth, Keats, Byron, DeQuincy, Scott, Coleridge, Lamb, Goethe, Victor Hugo, were producing masterpieces; yes, and Washington Irving and J. Fenimore Cooper. It was the era of the romantic movement, the greatest manifestation of literary genius since the time of Shakespeare.

Of composers there were Beethoven, and Shubert, and Mendelssohn, and other masters of the first rank. It was a golden age in music.

In science, there were Berzelius, Humphrey Davy, Faraday, Cuvier, Dalton, Drummond, Gay Lussac, Proust. It was the dawn of the modern productive era of science, which has continued to the present time, making the last hundred years the most prolific in discovery in the history of the human race.

True enough, every sequence is not necessarily a consequence. And wars in the past have not without exception been followed by a notable advance in the conquest of nature. But who will question that the great war exploits which terminated with Waterloo and New Orleans did not stir to the depths the emotions of men, inspiring writers, composers, painters, and also men of science, and in the latter awakening imaginative faculties, so useful in research? And if this be true, may we not expect that the stupendous struggle so recently ended will also be followed by a pronounced quickening of creative and inventive genius? And, if so, we may be sure, America will furnish its generous share in results.

In 1820, America could not be expected to figure prominently in art or science. Our country was new. The population was a largely rural. A considerable proportion was distributed over vast areas but sparsely settled, where life was rather primitive, and where men were hard put to it to provide the elemental needs—food, clothing, shelter—then medical service for the sick, rudimentary schooling for the children. And when the scientists of the old world

were engaged in extending the frontier of human knowledge, many of our most resourceful Americans were engaged in pushing the frontier of the white man's civilization westward. In 1820 the great migration over the Indian trails, which had been transformed into roads, was in full swing. On the Conestoga Road, the covered wagons of the travelers, headed for the land of mystery, adventure, opportunity—the West—were as numerous as the stannic "Lizzies" on our mountain roads during the summer months of more recent years. These men, who with their families, their lares and penates, were moving toward the setting sun, were principally farmers. But with them traveled the carpenter, the mason, the blacksmith, the miller and the millwright, the merchant, the doctor, and the apothecary. When a town of some size had developed, in due course, there appeared the apothecary shop, and the ring of the pestle proclaimed that medicines were being prepared *secundem artem*. And who will say that the inventive genius displayed by our pioneer doctors and apothecaries, in adapting limited resources to many and diverse needs, was not—in certain instances at least—as great as that of many a European research worker who by virtue of his better facilities succeeded in getting results which warranted their being recorded in the annals of science?

This was a truly heroic period in our country's history; it was the period of nation building, the various phases of which absorbed a large share of the energies of energetic men—the men with initiative. "In the four quarters of the globe, who reads an American book? Or goes to an American play? Or looks at an American picture? What does the world yet owe to American physicians and surgeons? What new substances have their chemists discovered, or what old ones have they analyzed?" Thus wrote Sydney Smith in the January number of the *Edinburg Review* in the year 1820. We need not take issue with him, although he was seemingly quite ignorant of American progress. Indeed, we may admit frankly that books of the first rank were not yet numerous. Odysseus was too busy to devote time to the composing of Odysseys. But some promising youngsters were playing marbles in American school yards—Whittier, Longfellow, Emerson, Hawthorne, Holmes—to mention a few; and in this year of the Missouri Compromise, 1820, the author of the Gettysburg address was doing his chores on a primitive Indiana farm.

* * * * * *

American science and American art were in the formative period. There were houses to erect, bridges to build, canals to dig, roads to be made passable. Just as American literature was principally political in character, American science was largely applied science, and art, industrial. As for the pharmacist, he was busy in providing the most necessary medicaments, and had, speaking generally, as yet no leisure for scientific experimentation.

We must not overlook the fact, however, that at a time when America as a whole was still in the pioneer stage, the older and more densely populated districts near the Atlantic seaboard, had attained to a high degree of culture. Here we find the colleges and universities of that period, and the learned societies, and the literary organizations, and the book publishers. It is here that we must look for the first developments in pharmacy.

In 1820, Philadelphia, which had served as the national capital, and where all the great Americans of the early days had sojourned, the largest city in the country at that time, with 130,000 inhabitants, an important seaport, in close touch with the old world civilization—Philadelphia, the seat of a university, and of the Institute founded by Franklin—became, as a matter of course, a center of learning. And medical sciences found here a particularly favorable atmosphere for growth. And hand in hand with the progress in medicine, we find the early progress of pharmacy.

* * * * * *

To be sure the apothecary of 1820 was practicing his art as it had been developed in Europe. If he was American-born, he had, in all probability, received his training under an apothecary who in turn had been an apprentice in a European pharmacy. If he was a rather recent accession to the population, he used, as a matter of course, the methods and the textbooks of his native land. The pharmacopoeias of London, Edinburg and Dublin were at that time in constant use. Uniformity of practice was conspicuous by its absence; for there was no pharmacopoeia as yet for this new nation; nor were there any purity standards for drugs or medicines. As for legislative regulations governing the practice of pharmacy, no laws of that character had as yet been passed. There were neither pharmaceutical organizations nor pharmaceutical journals. The important textbooks for pharmacists, with the exception of the American Dispensatory, then already in its fourth edition, were foreign.

The drugs which the apothecary had on his shelves were imported; and so were also his bottles, his jars, and in fact, even his window-panes, which made up his odd little show-windows. At this time, when Fulton's great invention, the steamboat, was still a novelty, and the word sailor still had its original meaning, the Delaware harbored ships from the most distant shores. And the inventories of cargoes, as published in the old time newspapers, include a large and varied list of drugs. It is from these inventories, in fact, that one may best reconstruct the old-time drug stock, for very few indigenous medicinal plants had received recognition. Here are some of the drugs which were deemed important in 1820—for they were obtained from overseas in large quantities: Aconite, Aloes, Asafetida, Belladonna, Benzoin, Camphor, Cantharidis, Capsicum, Castile Soap, Cinchona, Colchicum, Colocynth, Copaiba, Cubeb, Ipecac, Gamboge, Licorice Root, Licorice Extract, Hyoscyamus, Jalap, Lobelia, Myrrh, Nux Vomica, Opium, Rhubarb, Castor Oil, Sarsaparilla, Scammony, Squill, Tolu, Tragacanth, Valerian, Veratrum Album, Veratrum Viridi, Ginger. Yes, the general aspect of the 1820 drug store, with its old-fashioned shelf-ware, was odd enough; but the antique bottles held drugs which have retained their popularity to the present day.

The apothecary's stock was, however, not limited to vegetable drugs; he had a sundry supply of chemicals, as follows: Hydrochloric Acid, Nitric Acid, Sulphuric Acid, Citric Acid, Arsenic, Alum, Ammonium Chloride, Black Antimony, Barium Sulphate, Lime, Chalk, Marble, Copper Subacetate, Copper Sulphate, Prussian Blue, Sulphate of Iron, Mercury, Calomel, Corrosive Sublimate, Magnesium Carbonate, Magnesium Sulphate, Lead Oxide, White, Lead, Saltpeter, Potassium Carbonate, Cream of Tartar, Salt, Borax, Sodium Carbonate, Sodium Sulphate, Zinc Carbonate and Zinc Sulphate. His stock included the elements, Antimony, Bismuth, Copper, Iron, Mercury, Lead, Zinc, and Sulphur. These chemicals he bought, for they were even then made industrially.

But many chemicals now made exclusively on the industrial scale were early in the nineteenth century made by the apothecary in his own little laboratory. To be sure, there were some then, as at present, who chose to buy rather than to manufacture. But the list of chemicals actually made in stores at that time is surprisingly large, and included the following: Solution of Ammonium Acetate, Tartar Emetic, Solution of Magnesium Bicarbonate, Silver Nitrate,

Solution of Potassium Arsenite, Subnitrate of Bismuth, Lead Plaster, Iron Acetate, Iron Carbonate, Iron Oxide, Red Oxide of Mercury, Subsulphate of Mercury, Potassium Acetate, Rochelle Salt, Sodium Phosphate, Ointment of Mercuric Nitrate, Zinc Acetate and Zinc Oxide.

Of pharmaceutical preparations there was a large and varied list. It included Medicated Waters, Medicated Wines, Medicated Honeys, Medicated Vinegars, Spirits, Infusions, Decoctions (made when required), Tinctures (made by maceration—10 days) Solid Extracts, Mixtures, (some of which were Emulsions), Liniments, Ointments, Cerates, Plasters, Pills, Powders, and Confections.

It is indeed strange that the furniture and shelf-ware and equipment of the apothecary should have become in a hundred years so strikingly antique, while the materials which he dispensed, and with which he worked, should to so large a degree have continued in use uninterruptedly to the present day. How many drugs in the old inventories of ship cargoes are now obsolete? Very few. And as to preparations note how many have passed through nine pharmacopoeial revisions, experiencing radical alterations, but not deletions.

Nor should we picture the apothecary himself as an aged recluse, sitting at his desk, dressed in medieval garb, with metal-rimmed spectacles on his nose, "dandruff on his coat collar and a far-away look in his eye," sitting there inactive, surrounded by alembics and other gimcracks of the alchemist's stage properties—a man with whom we have nothing in common. For then, as at present, men were old, or young, or middle-aged; and they exhibited many variations in personality. But we may be quite sure that the apothecaries of 1820, living at a period of great activity, when stirring events were transpiring, when political interest was keen, when Philadelphia was conspicuously progressive, when the men of the hour were men of action—that these old-time pill rollers lived an active and full life, with varied interests—and were factors in this community.

But they indited no books. They published but little. The histories of Old Philadelphia fail to chronicle their doings. Their shops and stocks have disappeared. The very buildings in which they lived and worked have, in many cases, made room for larger structures of modern architecture. Yes, the old apothecaries of Philadelphia have vanished. "Like streaks of morning clouds they have melted into the infinite azure of the past."

The beginning of a new year always induces a retrospective mood,

and it may even lead us to read history. But why should we have a particular interest in 1820, aside from the interest which attaches to a time an even hundred years ago? The fact is, 1820 marks the close of an epoch. It marks the time when pharmacy, until then wholly dominated by European thought and precedent, awakened to its opportunity and struck for a certain independence. That very year the first national pharmacopoeia was issued. A few months later, in Carpenter's Hall, the first organization of apothecaries was formed. And a few months after that, this organization—The Philadelphia College of Apothecaries—opened its doors for the first session and for the first class of American students in pharmacy.

Hence, 1820 has a special significance for pharmacy.

What 1776 is to us as Americans, 1820 is to us as American pharmacists.

COMMENTS ON MAGENDIE'S FORMULARY.*

By Charles H. LaWall, Ph.M.

PHILADELPHIA, PA.

Books reflect the spirit of the time in which they were written as well as the knowledge of their authors.

Few books in science outlast more than a decade, or so, of active utility; after that they are usually of value only for occasional reference, and a scientific book which is nearly a century old is more interesting as a curiosity than for any practical value it may have in the science to which it relates.

It is interesting, however, to carefully review one of these older books occasionally to bring one to a realizing sense of how conditions have changed during a given period of time.

In pharmacy, medicine and chemistry such surveys are of peculiar value, for not only has there been a revolutionary change in the practice of each of these professions but the very nomenclature has undergone such a metamorphosis that the student of to-day would often find much of the text unintelligible without the use of a glossary.

Magendie's Formulary is a small book issued in an English translation in 1824. The book is of peculiar interest to pharmacists, chem-

* Read at the meeting of the Philadelphia Branch of the American Pharmaceutical Association.

ists and physicians as will soon be seen by a discussion of some of the details of its subject matter. Its translator, Robley Dunglison, M.D., was widely known as a medical author in the early part of the last century and published a medical dictionary which attained great popularity and went through many editions.

The title page itself is noteworthy for it is called a "Formulary for the Preparation and Mode of Employing Several New Remedies: namely, Morphine, Iodine, Quinine, Cinchonine, The Hydrocyanic Acid, Narcotine, Strychnine, Nux Vomica, Emetine, Atropine, Picrotoxine, Brucine, Lupuline, etc., etc."

To place oneself in the mental attitude of a period in which Morphine, Iodine, Quinine, etc., are heralded as new remedies requires some intellectual exertion, but fortunately the translator in his preface makes this easier by the quaintness of his language and the ingenuousness and frankness of his views and expressions.

He states: "Great credit is due to the French chemists, and especially to M. M. Pelletier and Caventou, for having discovered that the active principle of several of our chief remedies resides in peculiar alkalis; and also for isolating these alkalis so that they may be used in practice according to a determinate and intelligent principle. Great praise is also due to M. Magendie for the indefatigable way in which he has investigated the action of these new alkalis on the human body."

Here already we see evidences of the transferring from pharmacy to chemistry the credit for worthy achievements, for Joseph Bienaime Caventou (1795–1877) and Joseph Pelletier (1788–1842) were prominent pharmacists of their day in their native city of Paris. In 1820 when these two brilliant pharmaceutical workers discovered and named quinine, Pelletier was 32 and Caventou 25 years of age. In those days many important and epoch making discoveries were made by comparatively young men. Wöhler who revolutionized synthetic chemistry a few years later by the transformation of ammonium cyanate into urea, was only 28 years old at the time of this discovery.

Continuing, the translator says: "To druggists and to operative apothecaries it must be acceptable to have thus collected a full account of the mode of preparing these different alkalis."

This would indicate a more specific and distinctive use of these terms than is now accorded them. It is probable that the distinction lay in the fact that druggists were simply dispensers while operative apothecaries manufactured as well as dispensed.

After commenting upon Magendie's observations concerning the use of these "vegetable alkalis," which were not yet called "alkaloids," the translator continues, in partial disagreement, as follows:

"There exists, however, an objection to the principle of thus isolating and concentrating the active part of our remedies. Perhaps every practitioner feels that medicinal substances are more efficacious as they are presented to us combined by the Hand of Nature, than when their active part is isolated and recombined by the hand of man. Thus, then we are all inclined to give our remedies in substance, as it is called, rather than as prepared by the chemist or the druggist, and we are only deterred from using these natural preparations by the greater bulk, and other inconvenient properties of them, as compared with our more artificial preparations. Thus, also, we all feel that our artificial mineral waters, however accurately they may imitate the natural ones, do not produce the same good effect as those natural ones do; and even some of them, for instance, the bath waters, appear on analysis to be so pure and free from extraneous ingredients that we are reduced to the necessity of attributing their often powerful effects to the presence of some evanescent principle, which cannot be detected by chemical analysis."

Is this latter thought a prophecy of the discovery of radio activity? In this paragraph, too, the use of the word chemist as applied by an American translator to one who is concerned with the preparation of medicines, indicates again the close correlation at that time between chemistry and pharmacy. The word pharmacist was not then in general use in America and the word chemist here seems to be used synonymously with the word apothecary of the earlier paragraph.

In another paragraph the translator mirrors the sentiment of the times with respect to new remedies in a way that shows conditions to have been much as they are now, he says, speaking of himself in the third person as was the custom:

"He is almost angry when he sees the popular authors of the day sneering at the introduction of new remedies and saying in ignorant self conceit, 'Ay, here they come, one after another, vaunted to the skies for properties which sober investigation shows not to belong to them; we shall soon see them laid upon the shelf until they are again held up to the world as prodigies by some future enthusiastic searchers after novelty.' "

I wonder whether any other work ever heralded as new remedies

such a constellation of stars of the first magnitude as those given in Magendie's little book.

Many additional interesting views are then given by the translator who develops quite a narrative style at times and concludes as follows:

"The translator has added notes, which comprise a reference, he believes, to almost all the authorities on the subjects treated of. He wishes he could add records of the several remedies having been employed by British practitioners; but, with the exception of the prussic acid and iodine, which have been somewhat extensively used, he believes that the other preparations have not even been seen in this country, except as matters of curiosity. It were to be wished that M. Magendie had given the particulars of his experience of their prescription in the human subject. Several French journals, and especially his own excellent *Journal de Physiologie*, contain an abundance of cases in which the Sulphate of Quinine has been used with marked benefit in the latter stages of malignant fevers, in all forms of intermittent fever, and especially in many varieties of neuralgiæ; but the translator is ignorant that any published cases exist in which other alkalis have been employed."

In the author's preface, which is quite short by comparison with that of the translator, the following interesting statements occur:

"In spite of the opposition of the physicians of the seventeenth century (notwithstanding the celebrated decree of parliament which prescribed tartar emetic, and in spite of the spiritual sarcasms of Guy Patin), the utility of antimonial remedies has been long recognized. For once, at least, prejudice gave way before evidence.* * *

These substances * * * * act, when given in small doses. Every principle which might mask or hinder their action has been separated from them; their effects bear a decisive character which cannot be misunderstood for they have been studied with care both on animals and on man when in health and when in disease; a perfect knowledge of their chemical properties and great accuracy in their mode of preparation are sufficient to secure uniformity with regard to their strength and manner of action; and, lastly, each of them forms a medicine in its most simple and energetic state.

"Time alone can pronounce definitively on the advantages and inconveniences of these new remedies; but which ever way it may be, the following pages may be useful, by teaching the mode of preparing them without making it necessary to consult general treatises in

chemistry, or pharmacy; and by giving medical men every facility in submitting them to personal experience, which is frequently, after all, the only truly profitable course.

"I shall feel extremely grateful for any critical or other remarks appertaining to the substances treated of in this work. To those of my medical brethren who may be kind enough to address them to me, I return my thanks beforehand; and I shall hasten to turn them to the improvement of science, by inserting them in the next edition."

The book itself is a small duodecimo volume printed in Philadelphia in 1824. It consists of 268 pages.

The principal portion or about two-thirds of the book concerns itself with the detailed consideration of the "New Remedies" mentioned in the title, an enumeration of which will be interesting, each of the following subjects being accorded a separate section or chapter:

Morphine	Veratrine
Narcotine	Hydrocyanic Acid
Extract of Opium deprived of Narcotine	Solanine
Extract of Opium deprived of Morphine	Atropine
Iodine	Daturine
Resin of the Nux Vomica	Hyoscyamine
Strychnine	Delphinine
Emetine	Picrotoxine
Pure Emetine	Gentianine
Cytisine	Lupuline
Cinchonine and Quinine	Brucine
Esculine	

There is also given in this portion of the book a posological table and a table of preparations and their strengths in active principle.

There are three appendices to the book: Number one, containing a list of preparations and their compounds. Appendix number two concerns itself with poisons of mineral, vegetable and animal nature. Appendix number three is devoted to the "Art of Prescribing," with numerous detailed examples of prescriptions for various kinds of symptoms and diseases. An index completes the book.

Before commenting upon any of the details of the book in a systematic manner it may be well to make some general observations.

One of the first things to attract the attention as one scans the book

is the fact that the subject of weights and measures must have been in a transition state when the book was written, as there are parenthetic notes everywhere of which the following examples may be given:

1 lb. (15 oz. 6 dr. 1 grain troy)
1 oz. (7 dr. 52.5 grains troy)
1 gros (59 grains troy)
4 grains (3.28 grains troy)
1 grain (0.82 grain troy)

This is very confusing in the light of modern practice and even when taking into consideration the pharmaceutical history of weight systems and their fluctuations. In the first place it indicates two different standards for the grain in actual use, some light is thrown upon this in one portion of the book where it is stated, 1 grain Fr. (grain 0.82 troy). As Magendie was a French physician, the system was likely a French system. Calculating it in terms of troy grains the pound must have weighed 7561 grains troy and the ounce 472.5 grains troy, the gros (59 grains troy) was evidently the eighth part of this ounce.

It is odd, too, that Magendie should not employ the metric system, as it had been in use for some years in France. The only reference to it is found in several formulas where the liquid is directed in litres, while the solids are directed in grains, a jumbling together of the old and the new.

Another interesting impression gained by a general survey of the book is the list of substances and preparations unfamiliar to the pharmaceutical practice of to-day. Notable among these are Testarum Praeparatum (prepared oyster shells), Castoreum Rossicum (glands from the Russian beaver), Cuprum Ammoniatum, Ferrum Ammoniatum, Syrupus Mori (syrup of mulberries), Infusum Armoraciae · Composition (compound infusion of horse radish). Burnt oyster shell, burnt hartshorn and burnt sponge all seem to have been in use at that time.

The nomenclature, too, must call for passing comment. Subcarbonate was the term employed then where we now employ bicarbonate. Antimonium Tartarizatum was the older name for Tartar Emetic. Hydrargyri Submurias for calomel and Hydrargyri Oxymurias for corrosive sublimate, would look strange on a modern prescription. Tinctura Lyttae was the former name for Tincture of Cantharides. Turnsol paper was an indicator then used as we

now use litmus paper. The words chloruret for chloride and supertartrate for bitartrate are still intelligible.

One of the odd things noted is that Iceland Moss (Cetraria) was called Liverwort, and another that Opium was classed with the gum-resins.

One striking difference from modern books covering similar ground is the complete absence of chemical symbols or formulas. Although Dalton's atomic theory had been published fifteen years prior to the appearance of this work it is apparent that it had not been generally accepted, at least by authors in other countries.

The most outstanding feature of a cursory study of the book is the great amount of credit given to pharmacists for discoveries of value, among the pharmacists thus honored are Derosne, Pelletier, Caventou, Serturner, Boullay, Robiquet, Hecht, Henry, Pessina, Desfosses, Vauquelin and Brandes. This reminds us of the fact that the pharmacy of that period embraced not only what is now considered the professional side of pharmacy but much of chemistry as well. Many of those who became prominently identified with the development of chemistry obtained their training and experience in the practice of pharmacy and some, as Vauquelin, remained prominently identified with pharmacy during the whole of their subsequent careers.

Medicine was more dependent upon pharmacy than is the case to-day and there being no large pharmaceutical nor chemical manufacturing establishments, where scientific progress depends largely upon commercial exploitations of the product, there seems to have been a larger number of scientific workers at that time who were interested solely for the sake of the discoveries which could be made, than at any subsequent period of medical and pharmaceutical development.

It is not the intention in this brief review of the book to make critical study of the subject matter. It is intended only to give to one who has not seen the book an idea of its scope and character and to point out details of peculiar or particular interest. Thirty-five pages are given to the consideration of the manufacture of *Morphine* and the preparation of the acetate and sulphate of the alkaloid with comments upon their physiological action. It is stated that the result of the analysis of opium by Derosne, Serturner and Robiquet, shows opium to be composed of the following constituents: (1) Fixed oil; (2) matter analogous to caoutchouc; (3) a vegeto-animal substance not fully investigated; (4) mucilage; (5) feculent matter

(starch); (6) resin; (7) vegetable fibre; (8) narcotine; (9) meconic acid; (10) another unidentified acid discovered by Robiquet (probably lactic); (11) morphine. This list of constituents, excepting for the alkaloids, is in close accord with modern teaching and speaks well for the thoroughness of the work done by these early apothecary-chemists.

The composition of morphine is stated in percentage terms as follows:

	%	%
Carbon	72.00	71.7
Nitrogen	5.50	4.9
Hydrogen	5.50	6.7
Oxygen	17.00	16.7

The figures in the second column are present figures.

The comparison with the modern figures, shows a creditable degree of accuracy for the ultimate analysis of the time and for the atomic weights that were used in the calculation.

A Syrup of Acetate of Morphine containing 4 grains to the pound is recommended as well as a Syrup of Sulphate of Morphine of similar strength.

A formula is also given for a preparation called Guttae Anodynae (Anodyne Drops) which is as follows:

Acetate of Morphine	16 grains (13.12 grains troy)
Distilled Water	1 ounce (7 dr. 52.5 grains troy)
Acetic Acid	3 or 4 drops
Alcohol	1 gros (59 grains troy)

These drops, it is stated, are a good substitute for liquid laudanum, Rosseaus drops, tincture of opium, etc.

We here recognize an old friend which for many years was known, not by the name proposed by its author, but distinguished by his own name, as "Magendie's Solution." An alternative formula is also given in which 16 grains of acetate of morphine are directed to be dissolved in two drachms of diluted acetic acid, P. L. and 6 drachms of distilled water, the reason given being that the former solution is unstable from deposition of the morphine. It is probable that this same defect was later found also in the product made by the alternative methods, for formulas of later years called for 16 grains of Morphine Sulphate dissolved in 1 fluid ounce of distilled water.

It is interesting here to note that a few years after the appearance of Magendie's Formulary the U. S. P. of 1831 contained a formula

for a solution of Morphine Sulphate which differed from both of the solutions proposed by Magendie, being four times as strong as the weaker and sixteen times as weak as the stronger, leading to years of confusion and undoubted loss of life through prescribing and dispensing errors.

The following prefatory note to the chapter on *Narcotine* will be found of interest:

"My researches have not led me to consider this matter as a medicine. I shall, however, give its history here, because it is one of the immediate principles of opium, and has thrown and still continues to throw, much uncertainty over the subject."

The employment here of the word "immediate" as we use the word "proximate" is curious but is in accord with the particular meaning it is intended to convey.

Under the *Extractum Opii Narcotina Privatum* (extract of Opium deprived of Narcotine) a curious editorial note is appended by the translator in commenting upon Dr. Magendie's statement that an exciting property is noted in extract of opium which is not observed in morphine.

"M. Magendie's conjecture is probably true; and as said in the translator's preface, it forms one of the most valuable properties of the isolated morphine, that the stimulating and constipating effects of opium are thus avoided. Mr. Battley ought to publish the formula for his *liquor opii sedativus*. It is beneath him as an old practicing member of the profession and really *useful* chemist, or rather druggist, to practice such a paltry concealment."

The *Extractum Opii Morphine Privatum* (extract of opium deprived of morphine), is nothing more than a preparation made from the drugs of the opium left after extracting the morphine by the process described under that substance. The author states:

"This residuum still exerted a certain narcotic property on animals and on man; a less marked one, it is true, than that of the common aqueous extracts, but sufficiently strong to make it useful in practice. * * * It ought to be kept by all apothecaries who prepare their morphine."

Iodine is accorded quite a detailed description as to its properties and compounds. Credit is given to M. Courtois for its discovery in 1813 "from the mother waters of soda as it is obtained from sea weed." Potassium and sodium iodides are referred to as "Hydrio-

dates" of their respective elements. It is stated of them that "their solutions are still capable of dissolving iodine; thus forming an ioduretted hydriodate." Tincture of Iodine was made of a strength of 48 grains dissolved in 1 ounce of alcohol. The loss of strength which was already noted at that time in the tincture as prepared in that manner was explained as follows:

"It is to be feared also that the iodine may take up a portion of the hydrogen of the alcohol and thus be converted into ioduretted hydriodic acid." That these were days when enthusiasts went to almost any extreme in support of their views or to add to the sum total of human knowledge is shown by Dr. Magendie's statement that:

"I myself swallowed a spoonful of the tincture without further effect than a disagreeable taste, which went away by degrees after continuing several hours."

A formula for solution of Hydriodate of Potash, thirty six grains to the ounce is given as well as a formula for ointment of Hydriodate of Potash made by incorporating 29 grains of the salt with one and one-half ounces of hog's lard (a strength of about 4 per cent.).

The chapter on *Resin of the Nux Vomica* concerns itself with a discussion of the mode of preparation and uses of the alcoholic extract of the drug which is erroneously called the "resin." A formula for Tincture of Nux Vomica is given in which 3 grains of dry extract of nux vomica are directed to be dissolved in one ounce of alcohol. This preparation is less than half the strength of the present standard tincture.

Under *Strychnine* a method of separating and purifying the alkaloid is given. It is stated that:

"It is supposed that in the native state the strychnine is in union with a new acid, called by M. M. Pelletier and Caventou, Igasuric Acid from the Malay name of the St. Ignatius Bean." The dose of strychnine is given as one-twelfth to one-eighth grain. Formulas are given for strychnine pills containing one-twelfth grain of the alkaloid to each pill, and directing the pills to be silver coated to keep them from sticking together, the excipient and vehicle being conserve of roses. The translator adds in commenting upon this:

"We are accustomed to prevent pills from sticking together by rolling them in licorice powder or magnesia or flour; the old plan of

gilding and silvering pills is very inconvenient, for, if it be perfectly done, the pills will be effectually preserved from the action of the stomach."

A tincture of strychnine is directed to be prepared of a strength of three grains to the ounce, and a mixture of strychnine which is a suspension of the alkaloid in sweetened water of the strength of one-half grain to the ounce.

Emetine is directed to be prepared, as may be expected, from ipecacuana. An emetic mixture of emetine of a strength of nearly two grains to the ounce in sweetened orange flower water is described. Pectoral Lozenges of Emetine containing about one-seventh grain of emetine in each dose are described as are also Emetic Lozenges of Emetine containing over one-half grain each of the alkaloid. A Syrup of Emetine containing sixteen grains of emetine to the pound is also directed.

Another and purer form of emetine is also described and formulas given for preparations containing it in which one-fourth as much is directed to be taken of the pure Emetine as was directed in the corresponding preceding preparations.

Cytisine is a poisonous vegetable principle from the seeds of the Laburnum. No medicinal properties or uses are given.

Quinine and *Cinchonine* take up about twenty pages of the work. The species of cinchona mentioned are C. cordifolia, C. condaminea and C. oblongifolia; none of these species are recognized by the Pharmacopoeia of to-day. Methods for preparing these alkaloids are described, the cinchonine being obtained from the mother liquors after separating the quinine.

The percentage composition of quinine as given does not compare as favorably with modern figures as does that of morphine, due undoubtedly to the mixture of alkaloids which was then known by the same quinine.

	Composition as Given by Magendie. Per Cent.	True Composition. Per Cent.
Carbon	73.80	74.00
Nitrogen	13.00	8.90
Hydrogen	7.65	7.40
Oxygen	5.55	9.90

There were two sulphates of quinine described, one called Quinine Super Sulphate (acid sulphate of quinine). The other was

simply called Quinine Sulphate. These correspond to our present day bisulphate and sulphate, respectively.

The following formulas were proposed for the administration of these alkaloids:

Syrup of Quinine, thirty-two grains to the pound.
Wine of Quinine, twelve grains to the litre.
Tincture of Quinine, six grains to the ounce.
Syrup of Cinchonine, forty-eight grains to the pound.
Wine of Cinchonine, eighteen grains to the litre.
Tincture of Cinchonine, nine grains to the ounce.

Under *Veratrine* we find a confusion of fact and error. This "new alkali" is stated to exist in the seed of Veratrum Sabadilla (which is correct), and in white hellebore (which is incorrect, although excusable), and in colchicum (which is a startling and inexcusable error). The only method for its preparation, however, is that from Sabadilla seeds, although some space is given in this chapter to the therapeutic effects of colchicum.

Hydrocyanic Acid or *Prussic Acid* is described both as to its properties and its mode of preparation. Formulas are given of preparations for its administration and use. Among these are:

Mistura Acidi Hydrocyanici (Melange pectoral—Magendie)

Medicinal Prussic Acid	1 gros (59.07 grains troy)
Distilled Water	1 lb. (15 oz. 6 dr. 1 grain troy)
Pure Sugar	$1^1/_2$ oz. (11 dr. 10 grains troy)

Dose—One dessert spoonful.

Potio Acidi Hydrocyanici (potion pectoral—Magendie)

Infusion of Ground Ivy	2 oz. (1 oz. 7 dr. 45 grains troy)
Medicinal Prussic Acid	15 drops
Syrup of Marshmallows	Z oz. (7.52 dr. troy)

Dose—One dessert spoonful.

Syrupus Acidi Hydrocyanici (Hydrocyanic Syrup)

Clarified Syrup	1 lb. (15 oz. 6 dr. 1 grain troy)
Medicinal Prussic Acid	1 gros (59.07 grains troy)

The medicinal Prussic Acid above directed is described as being made from absolute HCN, by diluting it with 8.5 times its weight of distilled water. This produces an acid of about ten per cent. strength, which is stated to be of greater uniformity of strength than that produced by Scheeles process which, however, is not described but is mentioned as being usually of about half the strength of the author's. The curious precautionary note is attached to all of the

above formulas for preparations that: "It is necessary to shake the mixture every time it is used, lest great inconvenience arise from the acid being accumulated on the surface."

Solanine is described as being obtained from Solanum Nigrum and Solanum Dulcamara. It is stated to produce vomiting and sleep but that it had not yet been employed as a remedy in disease.

Atropine is stated to have been discovered in belladonna by Brandes, a contemporary and co-worker of Vauquelin, who is also stated to have discovered *Daturine* in stramonium and *Hyoscyamine* in henbane. It is stated of atropine that:

"When M. Brandes was experimenting on this alkali he was obliged to desist in consequence of violent headaches, pains in the back, and giddiness, with frequent nausea, which the vapor of atropine occasioned; it had, indeed, so injurious an effect upon his health that he has entirely abstained from any further experiments, and no one has hitherto repeated them. * * * Even the vapor of the various salts of atropine produces vertigo. * * * When he tasted the salt of atropine the dilatation of the eye followed to so great a degree that it persisted for twelve hours and was not influenced by the different shades of light."

Delphinine is described as having been separated from stavesacre seeds by M. M. Fenuelle and Lassaigne in 1819. It had not been used as a medicine.

Picrotoxine is credited to Boullay for its discovery and is described as being alkaline in character, a statement not in agreement with the fact as we know it.

Gentianine is also described as a vegetable alkali and M. Henry and M. Caventou are stated to have discovered it simultaneously and independently. This calls for the following comment from the author:

"This fact is doubly remarkable—first, because it proves how perfect the means of analyzing vegetables have become; and, secondly, because it shows the change which the progress of science has made in those who follow scientific pursuits. One hundred years ago, such a coincidence would have produced a violent quarrel, whilst now it only induces a feeling of joy in those who find their discoveries confirmed by others."

If the author had looked ahead one hundred years he might have been somewhat depressed. Such simultaneous discoveries to-day would probably result in patent right litigations.

Lupuline is credited to several investigators for knowledge concerning its existence in hops. Among these is the only American mentioned in the book: M. Ives, of New York.

Brucine was first isolated by Pelletier and Caventou from false Angustura bark, but Pelletier later discovered it in nux vomica in association with strychnine. It is stated to be an "organic salifiable base." Its properties are described as being those of strychnine in a milder degree and the statement occurs:

"It is for experience to decide whether this new substance should be preserved as a medicine or rejected."

In the posological table under *atropine*, *delphinine*, *daturine*, *hyoscyamine*, *narcotine*, *picrotoxine* and *solanine* it is stated that the dose had not yet been determined.

Credit for appendix number one is given to "Snyder's Examinations." This portion of the book comprises about fifty pages and contains methods for preparing the following classes of compounds: Acids, alkalies and their salts, earths and their salts, metals and their salts, vegetable drugs and their preservation, gum resins, expressed oils, distilled oils, distilled waters, infusions, mucilages, decoctions, extracts, mixtures, spirits, tinctures, wines, vinegars, honeys, syrups, confections, powders, pills, animal drugs, preparations of ether, plasters, cerates, ointments, liniments and cataplasma."

This is really a condensed kind of pharmacopoeia in which formulas and brief methods are given for preparing several hundred medicinal preparations. This portion of the book concludes with a table of strengths of preparations of opium, antimony, arsenic and mercury.

Appendix number two concerns itself with a twenty-page description of poisons of various kinds and their antidotes. Tests are given under some of the metallic poisons for their detection. Some of these are similar to those described in works on toxicology of to-day. Under vegetable poisons (alkaloids) the translator, who is responsible for the appendices, says:

"We are possessed of no tests by which we can distinguish poisons of this class and can only conjecture they have been taken by their taste or smell, and the symptoms."

In appendix number three there is a short discussion of the general principles of prescribing medicines, followed by typical examples of prescriptions of various kinds.

To show the prevalence of prescribing narcotics in this period of nearly a century ago it is surprising to see that out of seventy-seven examples of prescriptions, seventeen, or nearly one-quarter of the total number, call for opium or some preparation thereof.

It is interesting also to note that the translator has not ventured to make use of any of the "new remedies" described in the main portion of the work in his prescription examples.

It is both pleasant and profitable sometimes to wander through "quaint and curious volumes of forgotten lore." In the case of Magendie's Formulary our journey ends with a realization that the workers of that time, although poorly equipped, both as to fundamental facts and apparatus, were giants in achievement and it is for us to sincerely say, "Give us the hearts of our fathers of old."

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CLAY AS A MEDICINE.

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In the "Book of Books" are interesting references to clay. In the Book of Job (supposed to be the oldest book in the Bible), Job speaks of it as a building material, when he says, "I also am formed out of the clay," and in the 10th chapter, 9th verse he also says, "remember I beseech thee, that thou hast made me as the clay." Its tenacity is referred to in Psalm 40:2, where it speaks of the miry clay.

It is also referred to as an external application in the Gospel of John 9:6, where Christ anointed the eyes of the blind man with clay, sending him to the Pool of Siloam. It says, "he went his way and washed and came seeing." In this case the value of the application was physiological, to stimulate the man's faith.

In Wycliffe's translation of the Bible, he speaks of "rushes glewed with glewish clay and pitch" as the material with which the mother of Moses made the ark in which she consigned her infant son to the river Nile. As a side remark, the statement has recently

been made, that an official of the Standard Oil Co., reading in the Book of Exodus of the ark made from bulrushes daubed with slime and pitch, was inspired by it to prospect for oil on the banks of the Nile; it is reported as having been found in paying quantities.

We also read in the Book of Exodus of the Children of Israel, then in bondage to the Egyptians, being required to make a certain number of bricks per day, straw being furnished them as a binding material, for the clay of Egypt contains considerable sand. Finally to make their tasks harder, straw was refused them, and they were required to glean the straw from the fields, but the tale of bricks required of them was not diminished.

Clay was also used for seals, the jars of Egypt were sometimes sealed with clay, and mummy pits were also sealed with this substance, the remains of which is often found adhering to the door jambs. It is quite probable that the tomb in which the body of Christ was laid after the crucifixion was sealed with a clay seal. The seal used for public documents was rolled on the moist clay and afterwards placed in the fire and baked. It is said by Wilkinson "the sealing of doors" with clay to facilitate detection in case of malpractice is still common in the East. Before going farther it would be well to seek a definition of the word clay. The Century Dictionary says "it is the material resulting from the decomposition and consequent hydration of the feldspathic rocks, especially granite and gneiss and of the crystallin rocks in general." The National Dispensatory gives us a sharper definition, in which it says, "clay is essentially a hydrated aluminum silicate, and that the purest forms are kaolin, fullers earth and porcelain clay."

It is stated that in some parts of the earth, notably in some of our Southern States, it is a practice to eat what is called dog clay, or clay stone, the persons following this abnormal practice being generally lean and cadaverous. According to Dunglinson those who practice earth eating are called "geophagists," and the act is called "geophagism."

In trying to substantiate the above statement I came across an article in the *American Architect*, Vol. 23, page 214, by Dr. Frank H. Getchell of Philadelphia. The doctor went on a gunning expedition to Salisbury, N. C., in 1888. "In the wild hilly country back of the town he met the 'clay eaters,' a miserable race of beings with only enough energy to eke out a miserable existence. The soil is of a heavy clayey nature, but there are strata of clay heavier

than the rest. In the spring, torrents rush down from the high hills, form this clay into pellets, and rolls that accumulate in the valleys below, these are eagerly sought for and eaten." He states that he entered a cabin where a boy was crying, tied to the leg of a table; the mother stated that the boy wanted to go out and get some clay to eat, but she thought (although a clay eater herself) that he ought to eat some food first, of which there was plenty on the table. The doctor brought some of the clay home to Philadelphia and analyzed it with the aid of a friend, when it was found to contain arsenic.

In the *Literary Digest* of 1916, page 1027, is an interesting article, "Earth as a medicine and food." Some of the statements are as follows: "In the upper parts of Italy, Styria in Austria, and in certain parts of Germany the workmen butter their bread with a fine article of clay nicknamed 'stone butter.' The real home of earth eating is stated to be Asia. The famous earth of Nishpur, Persia, is used either raw or roasted, prepared with spices or perfumes. In the markets of Calcutta burnt clay is offered in small disks, the women being the principal consumers. In Africa along the shores of certain rivers in Senegambia, they use a soft soapy clay as butter. The natives of New Caledonia eat a ferruginous clay, either fresh or preserved in the form of dried perforated cakes for their dessert.

"In the neighborhood of Ouro, Bolivia, S. A., is found a white extremely delicate clay which is sent to the neighboring markets and eaten preferably with boiled potatoes.

"The ultimate reason for this dietic curiosity are manifold, the agreeable salty taste, and a perversion of the appetite being some of them. Sometimes it is the medicinal instinct, the craving for these peculiar substances is mainly a tropical instinct. This may explain the use of earth as a medicine by some of the greatest physicians of antiquity."

Current Literature published an article in 1902 taken from the *St. Louis Post Despatch*, entitled "The Dirt Eaters of St. Louis." It says "the dirt eater is peculiar about what dirt he eats, the article of his peculiar diet is technically a sand. It comes from the river bottoms and is made up of many little particles of granite, marble and flint, rounded with age. The chief dirt eater, Wm. Windsor by name, who is fat and jolly, has the sand collected and sterilized and distributes it among his followers at 25 cents a sack." It

seems to me that there is something of value in the claims of the health giving properties of this dirt. We all know that many dyspeptics suffer from constipation because there is no "roughage" in their food. It is asserted that much of the ill health of the Indian tribes on the Government reservations, is due to the Government issuing to them as rations, fine wheat flour, so different from the coarsely comminuted maize used by the Indians when running wild. The coarse grain containing so many indigestible particles stimulated the peristaltic movements of the bowels and constipation was unknown.

As to the use of clays as medicines we learn from the very interesting translation of Schelenz writings by Mr. Raubenheimer published in the AMERICAN JOURNAL OF PHARMACY, March, 1909, "that Dioscorides taught that alum possessed healing and astringent properties, that it cured boils and carbuncles, frost bite, etc.

"In ancient times, earths got the reputation of being remedies against poisons and also against plague or contagious diseases.

"The ancients went so far as to claim that the dishes and vessels burned from these clays and earths also possessed medicinal properties, inasmuch as they transferred magic power to the liquids contained therein. Red clays were also very popular, Bole Armenia was especially renowned as a remedy against plague.

"Many family recipes, handed down for centuries involved the use of various earths, externally applied as clay poultices for bee stings, ulcers, sores and all kinds of inflammations."

Thos. Keenan in an interesting article in the *American Druggist*, February, 1914, says that "Antiphlogistine which was placed on the market in 1893 was an impure form of kaolin, originally mined in Wyoming, now obtained from other sources. The name kao-lin is of Chinese origin, meaning high hill in allusion to a high hill in the neighborhood of the chief ceramic town in China."

We find that clay in various forms has been used as a medicine for generations, either externally or internally, its value probably residing in its powers of both absorption and adsorption. When used as a poultice its heat and moisture tend to soften and relax the tissues, thus relieving pressure upon the nerves and also taking up discharges from suppurating wounds, sores, etc.

"Prof. Una of Hamburg, a renowned dermatologist, holds that the therapeutic action of Cataplasm Kaolin is due chiefly to the glycerin, and others have expressed similar opinions. Una contends

that by increasing the sensible watery vapor the cataplasm causes an increased flow of water to the superficial tissues, and the serous soaking causes their softening. This may be, but he has overlooked the power of adsorption possessed by the kaolin in addition to the extraordinary power for absorbing water, it may be supposed to have great selective action in absorbing the secretions of the tissues. It is well known that clays are capable by adsorption of removing solid substances from solutions with which they come in contact, these bases and substances being held so that they can not be washed out again;" for this reason Prof. Fantus of Chicago, asserts that it is an effective antidote in strychnine poisoning. For pharmaceutical purposes kaolin should be treated with 5% of hydrochloric acid to remove lime, and afterwards levigated to remove sand. As it is free from organic matter it is an excellent excipient for making pills of potassium permanganate and silver nitrate.

The Cataplasm of Kaolin is a better preparation than originally introduced because both kaolin and glycerin are thoroughly heated to expel moisture.

According to the U. S. P., "clay has been used internally as a remedy in Asiatic Cholera, gastro-enteritis and dysentery, its effects in the latter condition are largely those of a protective."

According to Dr. Hess it surpasses either bismuth or chalk in lessening diarrhoea.

A MORE EFFECTIVE AND ECONOMICAL BASE FOR THE APPLICATION OF MUSTARD OIL THAN THE OLEAGINOUS BASES HERETOFORE EMPLOYED.

By George E. Ewe,

Philadelphia, Pa.

Dr. Torald Sollman, of the Pharmacological Laboratory of the School of Medicine, Western Reserve University, recently published an article in the *Journal of Pharmacology and Experimental Therapeutics* (Volume XI, 1918, pages 229 and 30), entitled "Cutaneous Irritation by Mustard Oil as Influenced by Various Solvents."

In that article, Dr. Sollman reported that the various vehicles for the mustard oil, which he tried, possessed irritant efficiencies in 1 per cent. solutions or suspensions in the following order:

1. Olive Oil 2. Turpentine	Practically no hyperemia.
3. Ether 4. Absolute Alcohol	Very little hyperemia.
5. 95% Alcohol 6. 50% Alcohol	Marked and lasting hyperemia.
7. Mucilage of Acacia 8. Simple Syrup	Most intense and persistent hyperemia.

The purpose of this note is to suggest an aqueous vehicle which is of more convenient consistency than mucilage of acacia or simple syrup. The vehicle which I wish to suggest is an aqueous 3 per cent. tragacanth paste.

This vehicle is made by soaking 3 parts of ribbon tragacanth and 97 parts of water together, with occasional agitation, for 24 hours, or until the ribbons are completely expanded. The paste is then squeezed through a piece of cheese cloth to remove obvious solid particles, if necessary. The paste, so made, is of ointment-like consistency and can be readily spread or rubbed on the skin.

The mustard oil can be readily incorporated with this vehicle by whipping it in with an egg beater (preferably of the covered type to prevent loss of oil and also annoyance to the operator). A covered emulsifier is also well adapted to the incorporation of the oil.

The mustard oil strength of the application is a matter for individual preference, based upon the effect desired and the length of time it is desired to allow the application to act. The average commercial mustard oil application, made with an oleaginous base, usually contains about 3 per cent. of mustard oil. Most pharmaceutical manufacturing companies list such a product. Therfore, a mustard oil application made with an oleaginous base and containing 3 per cent. of mustard oil was taken as a standard for the strength of mustard oil application, with which the trade is familiar, and this application was compared with mustard oil applications made with 3 per cent. tragacanth paste and containing various proportions of mustard oil, in determining the relative irritation efficiencies of the two types of bases.

The standard application with oleaginous base was made with a base consisting of 15 per cent. of paraffin and 85 per cent. of yellow petrolatum.

Repeated comparative irritation experiments, when made upon the shaven abdomens of guinea pigs, led to the conclusion, that, in general, a 2 per cent. mustard oil application made with tragacanth base, ably represented in irritation efficiency, a 3 per cent. mustard oil application made with a base composed of paraffin and yellow petrolatum.

The keeping qualities of the application made with tragacanth base are excellent provided the container is kept hermetically sealed; the collapsible tin tube being the logical container for this application.

PHARMACEUTICAL RESEARCH LABORATORY,
H. K. MULFORD COMPANY,
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THE COMPOSITION OF SALVARSAN.

At a meeting of the Chemical Society on March 18, a communication from the Wellcome Chemical Research Laboratories on the composition of salvarsan by Professor F. L. Pyman and Mr. R. G. Fargher was read by the latter. Commercial salvarsan prepared by the reduction of 3-nitro-4-hydroxyphenylarsinic acid by means of sodium hyposulphite, solution of the 3 : 3^1-diamino-4 : 4^1-dihydroxyarsenobenzene so obtained in methyl alcohol containing hydrogen chloride, and precipitation of the salt by means of ether, is generally regarded as 3 : 3^1-diamino-4 : 4^1-dihydroxyarsenobenzene dihydrochloride containing combined solvent. The latter according to the earlier work of Ehrlich and Bertheim, is methyl alcohol, and it has been suggested recently by Kober that the variable toxicity of salvarsan can be accounted for on this assumption. On the other hand the circulars of the first makers, the Farbwerk vorm. Meister, Lucius u. Brüning, suggest that the combined solvent is water. It has now been shown that the retained solvent consists almost entirely of water, support for the view being adduced from the elementary analysis of salvarsan and direct estimation of methyl alcohol, the amount present varying from nil to 1.4 per cent. The replacement of ether by acetone in the precipitation leads to a product, which, in addition to the customary solvent which can be removed in a vacuum, contains a molecular proportion of acetone.

[1] A contribution from The Wellcome Chemical Research Laboratories, London, Eng.

It was originally indicated by Ehrlich and Bertheim that the crude base from the hyposulphite reduction contained sulphur attached to arsenic which was removed by conversion into the hydrochloride. The authors found, however, several years ago, that commercial salvarsan of both British and German origin invariably contained sulphur, the amount varying generally from one to two per cent. (compare Medical Research Committee, Special Report Series No. 44, Reports of the Special Committee on the Manufacture, Biological Testing and Clinical Administration of Salvarsan, No. 1, p. 8). As the result of a comprehensive series of experiments it was concluded that at least a portion of the sulphur was present in acidic form, most probably as a sulphaminic acid, $R.NH.SO_3H$, and a product closely approximating in composition to the hydrochloride of the monosulphaminic acid of salvarsan, (HCl, NH_2) (OH) $C_6H_3.As_2.C_6H_3$ (OH) ($NH.SO_3H$), was actually isolated. The presence of this product, which could be estimated quantitatively with some degree of accuracy, did not as a rule account for the whole of the sulphur, and evidence was given in support of the assumption that a proportion of the remainder was attached to arsenic. It was also suggested that owing to the fact that salvarsan possessed some of the properties of a colloid sulphur might be present merely in physical association. The last section of the paper dealt with the preparation of pure diamino-dihydroxy arsenobenzene dihydrochloride, the most satisfactory process being the reduction of 3-amino-4-hydroxyphenylarsinic acid with hypophosphorous acid. It is interesting to record that a specimen of this pure material tested by the Medical Research Committee proved to be more than normally toxic.

FORMOSA, THE HOME OF CAMPHOR.

The March, 1920, issue of the *National Geographic Magazine* contains a profusely illustrated article on "Formosa the Beautiful," by Alice Ballantine Kirjassoff, in which an interesting account is given of the camphor production of this isle whose "plateaus covered with camphor laurel, are the largest tracts of these valuable trees in the world." The information contained therein that is considered of especial interest to the student of drug products is presented to our readers in this abstract:

The population of Formosa is mainly agricultural. The cultivation of rice, and more especially sugar-cane, is encouraged by the government, and these are grown in great quantities. However, the most interesting industry is the production of camphor, and it can be truly said to be peculiar to the island, when it is remembered that Formosa holds a practical monopoly in the world's market of this valuable drug. Before the war, Germany, by a secret process, succeeded in manufacturing some synthetic camphor, but so expensive was the labor entailed, that the artificial product could not compete with the natural camphor, nor is it likely to do so for some time to come.

Shortly after the Japanese came to Formosa, 25 years ago, the camphor industry became a government monopoly. Before that time there had been a great deal of ruthless waste, both in the cutting down of trees and in extracting camphor from them. At first, the Japanese, too, were careless in this respect, for the supply of camphor trees seemed practically limitless, but the great increase in the demand for the product in late years has made scientific afforestation necessary. Now large tracts of land are given over to the cultivation of the camphor laurel. The oldest trees are now twenty years of age and these, I am informed, are to be cut down next year.

According to an article appearing recently in a semi-official publication of Formosa, the camphor produced in the island at the present time is obtained entirely from natural grown camphor trees, the supply of which, it is anticipated, will be exhausted within ten years. For more than a decade, however, the camphor monopoly bureau had been planting camphor trees at the rate of more than 3,000 acres a year. In 1919 its program was expanded to more than 12,000 acres, and this will be the annual acreage planted in the future. In recent months the demand for Formosa camphor has been exceedingly heavy, especially among celluloid manufacturers. For the first three months of 1920 the Japanese Government has allotted to the United States 379,635 pounds.

Paradoxically as it may seem at first glance, the savage head-hunters of Formosa have been both an impediment and a boon to the camphor industry. As the forests are cut down, the head-hunters have to be driven further back into the mountains. These expeditions against the savages are never very successful, encountering as they do heavy obstacles in the way of dense forests, rapid streams without bridges, steep mountains without trails, and above all, the danger of sudden attack.

The life of a camphor worker is indeed an adventurous one; he is never safe. Although a woodman with an axe never moves except in the company of an armed guard, there is always danger of an ambush. Tales of the camphor workers recall the days of our pioneer fathers in the times of the tomahawk, the poisoned arrow, and the scalping knife. And yet if this menace had not existed, the camphor forests would have disappeared long ago. Thanks to the head hunters, there are still large tracts of virgin camphor forests in Formosa.

Camphor trees grow best on moderate, well drained slopes, not over 4,000 feet in elevation, where the sun's rays can reach them. Nowhere else in the world have these trees attained such height and girth. In the past, trees with a basal circumference of from 30 to 40 feet have been noted, but these have inevitably fallen victims to the woodman's axe. Perhaps in the uncharted forests, where the savage still holds sway, more of these noble specimens still grow unscathed. At present a camphor tree with a basal circumference of 20 feet is considered a very ample specimen.

In the point of view of value, few trees can rival the camphor. An average tree, say with a basal circumference of 12 feet, will yield about 50 piculs of camphor (approximately 6,660 pounds), which, at present market price, is worth about $5,000. Strictly speaking, there are no camphor forests, as the camphor laurel is only one of a number of trees growing together. The camphor trees are unusually beautiful, with shapely trunks and wide-spreading branches profusely covered with graceful leaves of a soft green.

Native stills are scattered here and there throughout the districts where crude camphor is collected, packed in tins and carried down precipitous mountain paths on coolies' backs to the nearest railway line, whence it goes to the refinery at Taihoku.

The still we visited was operated by the members of one Chinese family. When our party approached, some of the men were gouging chips from the trunks of camphor trees with adzes, while others were in the still feeding the fires. Adjoining the still was a shanty, where the workers lived, and in front of the door was a woman preparing the afternoon meal, while beside her a little boy was busy playing blocks with chips from which the camphor had been extracted. The stills are operated in a very simple manner. Camphor chips are placed in a chip retort over boiling water, and as the camphor vaporizes it passes through pipes into submerged vats, which are so

arranged that cool water from a mountain stream can run over them to accelerate crystallization. After the camphor has crystallized the vats are opened, and the product is placed on wooden troughs to allow whatever free oil there may be to drain off. This oil will yield 90 per cent. of crude camphor in the process of refining.

THE FAT OF MOMORDICA SEEDS.*

By C. E. Corfield, F.I.C., and E. Caird, B.Sc., A.I.C.

At the request of the Assistant Director of the Royal Botanic Gardens, Kew, an examination of the fat contained in the seeds of *Momordica cochinchinensis* (Spreng.) was undertaken with the view to ascertaining whether it might prove of commercial value.

Momordica cochinchinensis is a cucurbitaceous plant indigenous to Bengal, Tenasserim, the Deccan Peninsula, Formosa, and the Philippine Islands. The seeds are described by Hooker as "$^{7}/_{8}$" $\times$ $^{5}/_{8}$" and $^{1}/_{5}$" thick, many, horizontal, irregular, ovate, compressed, black, corrugated on the margins, sculptured on the faces." (*Flora of British India*, 2: 618.)

Very little information has been published concerning the fat of these seeds. In the *Pharmacographia Indica* (2 : 77) the statement is made that the seeds yield to light petroleum ether 43.74 per cent. of a slightly greenish oil, which smeared on a glass plate and exposed to a temperature of 100° C., could be scraped off the glass as a white powder, which, when boiled with petroleum ether, yielded only a trace of oil.

A general examination of the seed-coats and kernels has been made by Greenish and Baines, with the following results:

The average weight of each seed was 3.13 Gms., of which the seed-coat weighed 36.7 per cent., and the kernels 63.3 per cent.

A.—Seed-Coats.

The powdered seed-coats were extracted successively with different solvents, the solvent evaporated, and the residue dried at 100° C.

	Per cent. of Seed-Coat.	Per cent. of Seed.
1. Petroleum Spirit Extract	0.33	0.12
2. Ether Extract	0.16	0.06
3. Chloroform Extract	0.44	0.16
4. Alcohol Extract	1.62	0.59

No alkaloid was found in any of the residues.

* From *The Pharm. Jour. and Pharmacist*, January 17, 1920.

B.—KERNELS.

	Per cent. of Kernel.	Per cent. of Seed.
1. Petroleum Spirit Extract	47.06	28.90
2. Ether Extract	1.03	0.65
3. Chloroform Extract	0.17	0.11
4. Alcohol Extract	3.44	2.18

Again it is interesting to note that no alkaloid was present in the residue. The residue from the petroleum spirit extract was a pale brown viscous oil. On exposure to air it rapidly filmed on the surface, and on continued exposure it was converted into a whitish solid mass, easily reducible to a powder.

The result of these experiments led to the present examination of the seeds with a view to ascertaining whether the oil would be of commercial value as a drying oil.

Since, as will be shown later, the heating of the oil to a temperature approaching 100° C. had the effect of altering the composition of the oil, a method, other than that of extraction by means of a solvent and subsequent evaporation, was employed. Cold compression yielded little, since the fat was fairly solid. With the application, however, of slight heat the fat was readily yielded, and a method of extraction based upon this result was adopted. After removal of the seed-coats the kernels were coarsely powdered and submitted to pressure, the necessary heat being obtained by means of a steam coil round the press, and was adjusted to produce in the mass a temperature of about 40° C. The fat, of which a good yield was obtained, was greenish brown in color; had an unpleasant and penetrating odor; on cooling, solidified to a pale green, granular mass; when worked at atmospheric temperature became fluid. The green color was most probably due to traces of chlorophyll from the coating of the cotyledons.

On examination the fat gave the following constants:

Saponification value	185.2
Acid value	1.9
Iodine value	23.4
Refractive index (40° C.)	1.496
Ester value	183.3
Melting point	28° C.–32° C.
Unsaponifiable matter	a trace

After saponification of the fat the alcohols were separated, and were found to consist principally of glycerol, the residue giving no

evidence of the presence of wax-alcohols. The fatty acids on separation were found to be yellowish brown in color and solid. The following constants were observed:

Melting point	46° C.–51° C.
Solidifying point	44° C.–42° C.
Acid value	188.3
Iodine value	about 40

Since some considerable difficulty was encountered in determining the iodine value, the figure is not taken as final. Apparently the absorption is accompanied by the formation of some unstable compound, which is decomposed by sodium thio-sulphate. From these constants it appears that the fat consists chiefly of the glyceryl esters of fatty acids, the larger portion of which are saturated, but no attempt has been made to determine the composition of the fat.

On exposing the fat to the atmosphere a change in color and in form was noticed. The fat gradually lost its green color; assumed a pale yellow shade; a marked tendency for films to agglomerate was apparent; finally it became grandular in appearance. A systematic examination of these films was conducted with a view to determining the cause of these changes.

The following tables will show the course of the experiments:

A.—3.9536 Gms. Exposed to Air and Light.

Time of Exposure in Days.	Actual Gain. Gm.	Gain per Gramme per Day. Gm.
1	0.0024	0.00061
2	0.0070	0.00177
3	0.0216	0.00546
4	0.0312	0.00789
5	0.0505	0.00425

These figures are no measure of complete change, since, owing to agglomeration, the lower layers were not sufficiently exposed.

B.—3.5913 Gms., Exposed to Air, Without Access of Light.

Time of Exposure in Days.	Actual Gain. Gm.	Gain per Gramme per Day. Gm.
1	0.0003	0.0000835
2	0.0011	0.0003063
3	0.0025	0.0006961
4	0.0074	0.002060
7	0.0082	0.000761

In this experiment there was no agglomeration, and the only change in form was the appearance of small, white points in the green exposed surface.

C.—3.9894 Gms., Exposed to Light in Nitrogen.

For a period extending over seven days no change in weight took place.

From the above figures it is evident that the change observed is one of oxidation, which is immensely accelerated by the presence of light, since in that experiment in which the fat was excluded from light the change was extremely small, and only affected the most exposed portions. The effect that this oxidation has upon the solubility of the fat in the ordinary solvents was next ascertained. The data are tabulated below, and will again show that there was practically no change when the fat was kept in the dark:

	Petroleum Spirit.	Ether.	Carbon Tetrachloride.	Alcohol (97%).
Original fat.....	Soluble	Soluble	Soluble	Insoluble
Exposed in light....	Insoluble	Insoluble	Insoluble	Insoluble
Exposed in dark....	Faintly opalescent solution	Faintly opalescent solution	Faintly opalescent solution	Insoluble

Lastly, the effect of heat upon the appearance and properties of the fat was observed.

A.—3.5712 Gms. Exposed to Air and Light at 100° C.

Time of Exposure in Days.	Actual Gain.	Gain per Gramme per Day.
1.....	0.1912	0.05652
2.....	0.0614	0.03714
3.....	0.0140	0.00392
4.....	nil	nil

At this point the weight of the film had become constant, indicating that complete oxidation, and other change, if any, had occurred during the period of three days. The appearance of the heated film was markedly different from that of the film exposed at atmospheric temperature. The green color was lost and the fat assumed a granular, gelatinous form, of a pale brown color, finally becoming stiff, and easily disintegrated. The effect of heating during oxidation was, as in the case of oxidation at ordinary temperatures, to render the product insoluble in the fat-solvents, petroleum spirit,

ether, and carbon tetrachloride, while it remained insoluble in alcohol.

The following is a record of observations made on heating the fat slowly from 15° C. to 240° C.:

15° C.–50° C.—The fat became less granular, finally assuming a homogeneous appearance, and was of a dark brown color.

50° C.–100° C.—No change observed, except that the other color assumed a redder tint.

100° C.–110° C.—More transparent.

120° C.–130° C.—Color still lighter.

130° C.–180° C.—Appearance of small bubbles, probably due to the escape of a small quantity of volatile matter.

200° C.–240° C.—A greenish brown mobile liquid.

On cooling, the fat remained as a brown viscous liquid of the consistency of castor oil, and the solubility remained as that of the original fat. On exposure in thin layers this liquid did not exhibit the character previously recorded of the fat. During two days no film appeared, whereas on further exposure the thinnest portions formed a transparent skin of the nature of a varnish.

In conclusion, the evidence is that the fat shows certain characteristics of drying oils, such as Tung oil, without the property of producing a varnish, as is the case with drying oils, such as Linseed oil, whereas after heating it behaves as a semi-drying oil, and it would seem that in this condition, admixed with drying oils, it might be used in the production of paints and varnishes.

THE ASSAY OF IRON FILINGS FOR PHARMACEUTICAL USE.*

By H. Hindley, Ph. C.

Iron in the form of fine filings, though not official in the B. P., is frequently used in the manufacture of medicinal preparations containing iron, instead of nails or wire, and as it is more liable to contamination in this form, it demands more careful examination. From a medicinal point of view its actual content of metallic iron

* From *The Pharm. Jour. and Pharm.*, Feb. 7, 1920.

is not so important as in ferrum redactum, which depends for its medicinal properties on the metallic iron it contains. It is necessary however, that it be nearly pure, as the presence of much oxide would seriously alter the iron content of the preparation if allowance were not made. An estimation of its iron content, both free and combined, is therefore necessary.

Iron filings are official in the German Pharmacopoeia as ferrum pulveratum, but the assay process therein given estimates the total iron only, whether free or in any state of oxidation. The proportion of free metallic iron may be estimated by the official B. P. method for ferrum redactum, by allowing the filings to react with copper sulphate solution and titrating the ferrous sulphate thus formed with potassium permanganate. In using this process for ferrum redactum, it has been pointed out by Peck (*Year-Book of Pharmacy*, 1898, p. 399), that it is difficult to secure accurate or even concordant results unless certain experimental details be adhered to. This lack of concordance is due chiefly to the incompleteness of the reaction, in varying degree, due to the formation of a protective coating of metallic copper on the iron particles, and to the massing together of the particles, preventing the reaction proceeding with sufficient rapidity to be completed in the specified time. These objections apply to filings also, with greater force if they are somewhat coarse, and if care is not taken results may be obtained which are below the truth or above for a reason to be discussed. Peck directs that the copper sulphate solution be added cold to the iron, the solution heated in a flask with Bunsen valve for half an hour, then rapidly filtered and titrated. In assaying a number of samples of iron filings by the B. P. process another complication made itself evident, and the results obtained were not only inconcordant, but in some cases impossibly high, being several figures over 100 per cent. Using Peck's modification, similar results were obtained. This was not explainable for some time, till on one occasion a smell of phosphine was noticed in the hot, unacidified solution. The odor was like that of acetylene from calcium carbide. This latter smell is really due to traces of phosphine, pure acetylene being odorless. The presence of phosphine suggests the presence or formation of hydrogen, either as occluded hydrogen or formed by galvanic action between the copper and the iron, and combing while nascent with the phosphorus in the iron. The latter explanation is the more probable. As phosphine, PH_3, reacts with potassium permanganate, $KMnO_4$, according to the

equation: $8KMnO_4 + 12H_2SO_4 + 5PH_3 = 4K_2SO_4 + 8MnSO_4 + 12H_2O + 5H_3PO_4$ it was considered likely that traces of phosphine (and probably some hydrocarbon) were responsible for the abnormally high results obtained. It will be seen from the above equation that

$$\begin{array}{r} PH_3 = 8\ Fe \\ 8KMnO_4 = 5PH_3 = 40FeO \text{ — } i.\ e., \\ 35 = 447 \end{array}$$

so that phosphine has the reducing power of about thirteen times its weight of iron; consequently, a little in the solution, if calculated as iron, would produce the high result. So little as 0.000437 Gm. of phosphine reduces 1 Cc. of $N/10$ $KMnO_4$. Sulphuretted hydrogen would act similarly, but the proportion of phosphorus in iron (which may be 0.7 per cent. in cast iron), judging from published analyses of iron, is from four to seven times that of sulphur. That the gas evolved was phosphine was proved by dissolving 5 Gms. iron filing in dilute sulphuric acid in a flask and passing the gas generated through a solution of potassium permanganate in another flask. The permanganate solution was then decolorized with tartaric acid and tested with excess of ammonium molybdate in nitric acid, when ample evidence of phosphate was obtained. It might be expected that if phosphine is formed it would be precipitated from the solution as copper or iron compounds. In the case of small amounts, however, and under certain conditions, such as the reducing influence to the copper-iron couple, it is possible that precipitation may not take place. It was notable that the odor of phosphine was not always perceptible, though some may have been formed in further experiments on the sample which had previously yielded it under apparently the same conditions. In fact, odor of phosphine was not the rule. Assuming, phosphine, however, to be the disturbing factor, prolonged boiling was tried to eliminate it from the solution, and this was found successful. The following process was employed:

0.025 Gm. of iron filings and 1.25 Gms. of copper sulphate were ground together in a small mortar to thoroughly subdivide the filings, then rinsed into a narrow 4,000 Cc. glass beaker with about 60 Cc. of cold water. The contents of the beaker were then brought to the boil and kept briskly boiling till reduced to about 15 Cc., then rapidly filtered, preferably at the pump, through a Gooch crucible or through a small Buchner funnel. The time of filtration is thus

reduced to a few seconds, lessening the chance of oxidation and mechanical loss. But filtration must be thorough, and no trace of precipitate must be allowed to remain in the solution, for it has a strong reducing action on the permanganate. Wash with about 100 Cc. of cold water, add sulphuric acid, and titrate as usual.

This treatment appears to get rid of the phosphine. Either it is volatilized as formed, or it is completely precipitated at the boiling temperature by the excess of copper sulphate. Brisk boiling also aids interaction by keeping the particles from massing together There is no fear of oxidation while boiling, as, in the narrow beaker the liquid is covered with an atmosphere of steam. The originators of the process official in the German Pharmacopoeia may have had the effect of such impurities in mind when they devised the method which is as follows:

1 Gm. of ferrum pulveratum is dissolved in about 50 Cc. of dilute sulphuric acid and made up to 100 Cc. with water. 10 Cc. of this solution is treated with $^1/_2$ per cent. solution of potassium permanganate, sufficient to produce a faint pink. The solution is then decolorized by means of tartaric acid, 2 Gms. of potassium iodide are added. The stoppered flask is allowed to stand one hour, and the liberated iodine is then titrated with $N/10$ sodium thiosulphate. The iron and such impurities as phosphorus and sulphur are fully oxidized. The final oxidation products of the phosphorus and sulphur have no effect on the potassium iodide, whereas the ferric sulphate is reduced to ferrous sulphate, which liberates the equivalent of iodine. The process is required to yield 97.7 per cent. of total iron. The same process is used for ferrum redactum, which is required to indicate 96.6 per cent. of total iron. It must not be forgotten, however, that a standard base on the total iron is sufficient to ensure a minimum of the free metal being present when the figure approaches 100 per cent., as in the German test. But it fails to give a measure of the free metal, and is, therefore, only a check on a prearranged standard. Clearly, filings from a cast-iron at 95 per cent. or less would be rejected by the German Pharmacopoeia test, and only filings from steel or wrought iron which indicate 98 per cent. to 99 per cent. free iron are considered suitable. Such a standard determined with the precautions indicated, secures medicinal preparations with full iron content.

The work in connection with this note was carried out in the laboratory of Messrs. Evans Sons, Lescher and Webb, Liverpool.

PURIFIED CRESOL (CRESYLIC ACID).*

By Herbert C. Hamilton,

Research Laboratory, Parke, Davis & Company, Detroit, Mich.

One of the minor problems arising from the war because of interference with importations from Europe was that of obtaining a substitute or equivalent for trikresol, a proprietary article imported from Germany and extensively used as a preservative and disinfectant. As has been shown to be true in many other instances, it is equally true in this case that there is no lack in America either of crude material or of ability to purify it. There was required only the incentive.

Trikresol is so named because it is a mixture of the three isomeric cresols naturally occurring in coal tar. These three cresols are identical in composition, but have different physical and bactericidal properties. These differences, however, are unimportant and nothing of practical value results from their separation.

Trikresol, while useful as a general antiseptic and germicide, with a phenol coefficient of $2^1/_2$ to 3, found its more extensive application as a preservative for serums, vaccines and similar biologic substances. Careful research has proved that for this purpose, with one exception,[1] no other antiseptic has been found entirely suitable, either because of its efficiency or the toxic or irritating action when absorbed from a hypodermic injection.

The cresols have practically the same toxicity as pure phenol, as shown in the accompanying table, but the corrosive action is so low and the germicidal value so high in comparison, that the use of phenol as a germicide is no longer logical. To illustrate: cresol with a coefficient of 3, when diluted 1 to 60, is equal in every respect to a 5 per cent. solution of phenol, while the toxicity of the solution is only one-third as great because of the degree of dilution, and the corrosive action, while not measurable with accuracy, is less than one-third as great.

Superficially trikresol is identical with the cresols of coal tar, since an average sample of the latter contains not over 5 per cent. of constituents other than the cresols. But it was very promptly observed that cresol, as it appears on the market under various

* *J. Ind. Eng. Chem.*, Jan. 9, 1920.

[1] Carl Voegtlin, Hygienic Laboratory, *Bulletin* 96.

names, is inapplicable for use as a serum preservative because of three specific reasons, all of which are interrelated, namely:

1. Incomplete solubility.
2. Disagreeable odor.
3. Color.

Incomplete solubility is due to the presence of one or more of three substances, naphthalene, colored compounds formed apparently at the expense of the cresols, and phenols of higher boiling point and less solubility than the cresols.

The disagreeable odor is largely due to pyridine and partly to the naphthalene which have been incompletely separated in preparing the crude phenol.

The origin of the color which appears in cresol and phenol is more or less uncertain. It is probably not always due to the same cause, but may in some cases be due to impurities in the cresol, and in others, to incidental conditions, such as the effect of light or air or the action of alkali from the glass container.

It is said that the germicidal value of a highly colored lot is greater than that of a clear straw-colored sample. This, however, is probably a hastily drawn conclusion from insufficient evidence, since different lots are found to differ much more than a water-white and a colored sample from the same lot. Redistillation corrects the color and can improve the solubility and odor, but not to a sufficient extent.

The development of color appears to be a property not only of cresols but also of pure phenol and no method has been devised by which such a change can be entirely prevented. The coloring matter appears to be a new constituent and to have properties entirely different from those of the original cresols. It remains behind on redistillation, but further quantities form so that only the freshly distilled material is entirely colorless.

Gibbs[2] ascribes the development of color by the action of sunlight to a labile hydrogen atom and describes experiments with the three cresols in which coloration occurred in varying times with the different ones, but all were affected in the same way.

This, however, does not explain the immediate cause of this coloration. A sample of a freshly redistilled lot was set in the sunlight and another was kept in an amber bottle in the dark. The first, after three months, was very slightly tinged with pink, the

[2] *J. Am. Chem. Soc.*, 34: 1190, 1912.

other was decidedly reddened. This is not an isolated case but was a careful demonstration of what frequently occurs in practice with large lots. Sufficient observations have not been made to arrive at a theory as to the cause or causes of the change and no method has consistently prevented its recurrence.

The disagreeable odor is due to pyridine and naphthalene which one would naturally think were eliminated in the process of separating the cresols from the creosote oil. In this process the acid constituents of the oil are combined with an alkali such as caustic soda or lime, and in this form should be readily separated from the neutral and basic substances. In fact only a very small percentage of these bodies remain with the cresols and are dissolved with it when its alkaline combination is broken up, as it is in practice, with carbonic or sulphuric acid. The odor of crude carbolic acid is not distinctly like either impurity, since the natural odor of the cresols masks the others until they are unrecognizable. Distillation carries these impurities over and little improvement can be accomplished by this step as the sole purifying process.

Nevin and Mann[3] depended on separation by redistillation to obtain the proper fraction but this, as noted above, while removing the colored and some of the insoluble impurities, fails to remove pyridine and naphthalene, which are responsible for the odor. While this odor is perhaps negligible, it is easy to detect the difference between two lots of cresol, one purified to remove the odorous impurities, as will be described later, and the other purified by redistillation only.

In my experiments an attempt was made to study the sodium cresylate compound when prepared in molecular proportions. In concentrated solution no observable separation takes place to indicate that purification by this means is feasible, but on further dilution the naphthalene crystallizes out in a well-recognized form and often in considerable quantities. This can be filtered out, but on again recovering the cresols no material improvement in odor results, because the naphthalene is the less objectionable of the two.

My next experiments were carried out having in mind the examination of sodium cresylate in solid form to see if impurities could be detected, identified, and removed by tests applied to the dried or crystallized material.

[3] *J. Am. Chem. Soc.*, 39: 2752, 1917.

In the process of evaporating the solution it was observed that the vapors smelled distinctly of pyridine, and further, that after a certain time no odor of this character could be detected. Carrying this experiment to its conclusion and recovering the cresols, they were found to be practically free from the objectionable odor of the crude cresols and on redistillation a water-white soluble product was obtained with no odor but that of the pure cresols.

The practical working out of this process is as follows: Dissolve the crude cresol in a solution of caustic soda molecularly equivalent, using sufficient water to dilute the sodium cresylate to a 25 per cent. solution. Then boil, or drive live steam through the solution until the odorous impurities have passed off with the steam. If the solution is boiled over an open flame, care is necessary to avoid concentrating the solution too much, as the cresylate breaks up and free cresol is volatilized and may take fire. It is important to add water to replace that lost by evaporation.

The time necessary to vaporize the impurities varies with the amount present, and can be determined by smelling. "The nose knows" when the pyridine is gone. The solution should be allowed to become cold and then observed to see if naphthalene or other neutral oils are present. Any floating oil can be skimmed off, while the naphthalene, if any remains unvolatilized, can be removed by filtration or centrifuging.

Treatment with sulphuric acid equivalent to the alkali originally used will break up the cresylate and set free cresol which can be recovered as a supernatant layer over the sodium sulphate solution. Separation should be very complete, as the water otherwise present causes trouble in distilling.

The removal of these two impurities, which rarely amount to more than 5 per cent. of the cresols, is therefore equivalent to a complete purification of the substance, since the color is automatically removed by redistillation, and a careful observation of the temperature of distillation at the end of this step insures the removal of the higher boiling phenols which are less soluble than the cresols and may for that reason be considered as impurities.

TOXICITY ASSAY.

Sample	Purified cresols
Animal	Guinea pigs
Method	Subcutaneously

CRESOL.

Wt. of Animal.	Dose per Kilo.	Result.
0.572	0.6	Recovered
0.611	0.6	Recovered
0.577	0.7	Died
0.640	0.7	Died
0.572	0.8	Died

PHENOL.

0.437	0.5	Recovered
0.480	0.5	Recovered
0.446	0.6	Died
0.480	0.6	Died
0.570	0.6	Died
0.340	0.7	Died

Toxicity about 90 per cent. of that of phenol: Worth Hale, Hyg. Lab., *Bulletin* 88; James Leake and Hugh B. Corbin, Hyg. Lab., *Bulletin* 110.

GERMICIDAL ASSAY.

Sample.....Purified cresols.
Method.....A. P. H. A. phenol coefficient method. (Committee Report, *Am. J. Pub. Health*, 8 (1918), 506.)
Organism.....*B. typhosus.*

DILUTIONS.	TIME AND RESULTS.			
Sample.	5	10	15	20
1–300	—	—	—	—
1–350	—	—	—	—
1–400	+	—	—	—
1–450	+	+	—	—
1–500	+	+	+	+
Phenol				
1–100	—	—	—	—
1–110	+	—	—	—
1–120	+	+	—	—
1–130	+	+	+	+
1–140	+	+	+	+

Coefficient 3.6.

The cost of the process is inconsiderable, since no complicated chemical or mechanical steps are necessary. It is evident from observation of the steps in the process that no unusual equipment is needed and only the commonest chemicals are employed. It is evident, therefore, that here again the German chemists profited at our expense for many years while the crude materials waited only for proper development.

The logical place for the economical production of the refined cresols is where the crude material is first separated from the oils

distilled from coal tar. These crude phenols, necessarily dissolved in alkali to separate them from the neutral oils, can, at that point, by suitable means, be freed completely from their impurities, and after fractional removal of the phenol proper, the cresols could then be recovered in pure form with one operation.

The production of purified cresols is, therefore, a logical opening for American enterprise, as well as American resources, for here, as in Europe, are immense supplies of coal tar on which to draw for crude materials.

BENZYL BENZOATE.*

As the drug has come into fairly extensive use, some notes on its pharmacy, chemistry, and general properties may be of service.

Benzyl benzoate, $C_6H_5COO.C_6H_5CH_2$, is the benzyl alcohol ester of benzoic acid. It occurs naturally in several of the balsamic resins, such as balsam of Peru and in balsam of tolu. Possibly the antispasmodic action of these drugs is due in some measure to its presence. It is contained in the volatile oils of many fragrant flowers, such as hyacinth, jasmin, orange, etc. It may be obtained by the fractional distillation of the oily portion of balsam of Peru; it is made synthetically in several ways. On a manufacturing scale it may be prepared either by treatment of benzyl chloride and benzoic acid with phosphorus oxychloride, or by treatment of benzyl chloride and sodium benzoate with soda ash.

It is a colorless oily liquid, odorless or with a faint aromatic odor, and having a sharp burning taste. It is insoluble in water or glycerin, but is miscible in all proportions with alcohol, chloroform, or ether. When ignited it burns with a smoky flame. Sp. Gr. 1.09 to 1.13 at 15° C. It is neutral to litmus. Alcoholic solution of KOH saponifies it readily. This solution when neutralized gives with ferric chloride a flesh-colored precipitate, and upon acidulation a white, crystalline precipitate of benzoic acid separates. This may be extracted with ether and identified by means of the usual tests for benozic acid. Benzyl benzoate for medicinal purposes should be free from chlorine and should contain not less than 95 per cent. of pure benzyl benzoate. The residue from ignition of 10 Cc. should weigh not more than 0.1 Mgm., that is, practically *nil*. The volumetric test given by the American Medical Association is as follows: To about 2 Gms. benzyl

*From *The Prescriber*, March, 1920.

benzoate, accurately weighed, add 25 Cc. half-normal alcoholic KOH and heat the mixture to incipient boiling under a reflux condenser for one hour. To the cooled solution add phenolphthalein and titrate the excess KOH with half-normal HCl. Each gram of benzyl benzoate requires for saponification not less than 8.9 or more than 9.4 Cc. of half-normal KOH.

The dose of benzyl benzoate is 0.3 to 0.5 mil. (5 to 7 minims). It may be given in 20 per cent. alcoholic solution (dose, 20 to 30 drops). A proprietary emulsion contains benzyl benzoate 20 Gm. in alcohol 78 Gm. to which 2 Gm. of castile soap is added as an emulsifying agent. Gum acacia may also be used as emulsifier.

A PROBABLE NEW SOURCE OF GINGER.*

In times like the present, when every bit of information affecting the increased production of vegetable products, whether for food, medicine, or manufacture, is especially valuable, the following extracts from an article on "Wild Ginger" in a recent number of the *Agricultural News* cannot fail to be of interest. It may be stated that the *Agricultural News* is one of the official publications of the Imperial Department of Agriculture for the West Indies. It is pointed out that the true ginger plant (*Zingiber officinale*) is not known in a wild state, but that it is doubtless a native of tropical Asia, where it has been cultivated and from where the rhizomes have been exported from very remote times. From Asia it was introduced into the West Indies, and has spread now throughout the warmer parts of both hemispheres. The name "ginger" is derived through the Greek from the ancient Sanscrit. It was known as a spice to the early Greeks and Romans. During the Middle Ages it is frequently mentioned in European lists of articles derived from the Far East. In an interesting account of a journey down the Magdalena River and through the Peninsula of Goajira undertaken at the request of the Minister of Agriculture and Commerce of the Republic of Columbia for the purpose of studying the agricultural conditions and possibilities of the region, Mr. M. T. Dawe, F.L.S., Agricultural Adviser to the Government of Columbia, makes the interesting statement that he found ginger growing wild over extensive areas on the

* From *The Chemist and Druggist*, Feb. 7, 1920.

lower hills of the Sierra Nevada range. He thinks, therefore, that the theory that ginger was originally a native of tropical South-East Asia must be abandoned and Columbia be considered its original habitat. This, however, would be open to question, for it is quite certain that ginger was introduced by the Portuguese into Brazil as early as the middle of the sixteenth century, and it is probable that the ginger now found growing wild in Colombia is really only the descendant of plants escaped from cultivation which have become thoroughly naturalized. Mr. Dawe goes on to remark that this discovery is of commercial importance, owing to the fact that there are extensive wild sources of a valuable product which can be immediately exploited and a new local industry established in the collection and preparation of the roots. Apart from the question of the exploitation of the wild product, there raises the possibility of its cultivation and the initiation of a new plantation industry for that part of Colombia. Ginger is well known to be fastidious as to its soil requirements, and the fact that it is found growing wild is a proof that not only the climate but the soil is suitable to it. The rhizomes of the wild plant, however, are not nearly so large as those of the cultivated ginger. Mr. Dawe adds a word of warning to intending exporters of ginger, whether wild or cultivated, to the effect that whatever method of curing and drying be employed, the rhizomes must be thoroughly dried and bleached before shipment. The cultivation of ginger in the Kandy district of Ceylon is also the subject of a note in the *Tropical Agriculturist*, in the course of which it is stated that the area under ginger is extending in the island. In the Kandy district during 1917–18 eighty acres, yielding 480,000 lbs. of green ginger, equal to about 850 cwt. dry ginger, was obtained, and particulars are given as to how this was raised, the seed being obtained from India. Ceylon could easily produce a large quantity of ginger, but the chief obstacle is that the villagers are ignorant of the method of curing it for the market. Locally there is always quite a good demand for green ginger, which sells at 12 to 15 cents, and even 20 cents to 25 cents per lb., so that there are no exports. It would be worth consideration whether a profitable business could not be started in curing ginger for the market, as a well-cultivated, good crop may yield up to 15,000 lbs. to the acre. At the present time most of the ginger imported into London is produced within the British Empire, but there is no reason why Ceylon should not make it a paying minor product.

PRODUCTION OF GLYCERIN FROM SUGAR.*

(Prepared by the Research Division, Bureau of Foreign and Domestic Commerce.)

At the beginning of the war Germany was "swimming in sugar," to use an expression of the *Frankfurter Zeitung* (May 22, 1915). Production had been greater than ever; large quantities left from the previous campaigns were still available; exportation had stopped. One of the 10 "war commandments," proclaimed on bills posted in all railway stations, advised people: "Use plenty of sugar with your meals; sugar is an excellent food." Certain measures of the Government, however, soon made it impossible for the people to follow that advice, and sugar became scarce in the market, although it was known that stocks were plentiful, for the production of the 1913–14 campaign had yielded 2,715,870 metric tons of sugar. Germany had been the leading sugar-producing country of Europe, and yet the people suffered from scarcity of sugar during the war and were compelled to use honey and saccharin as substitutes. It was supposed that owing to the shortage of fats the Government was trying to conserve the stocks of sugar. It now appears that large quantities of sugar that had been withdrawn from human consumption were used in the manufacture of glycerin for war purposes. The process of production is described by Dr. W. Constein and Dr. K. Ludecke in *Die Naturwissenschaften* (1909, p. 403).

Process of Production.—The consumption of glycerin in the manufacture of cosmetics and for other purposes, chiefly in the manufacture of explosives, increased enormously during the war, while the supply of the raw materials—fats—was constantly diminishing. It was therefore necessary to seek other sources, and sugar was selected, as its chemical structure is somewhat similar to that of glycerin. The transformation of sugar into glycerin was accomplished by the biochemical method. It has been known for a long time that in the ordinary fermentation of sugar with yeast small quantities of glycerin would be produced, amounting to about 3 per cent. of the sugar. By adding alkalies to the liquid in fermentation the production of glycerin was increased. It was found that almost any salt with an alkaline reaction could be used for that purpose. Experiments were made with acetate, bicarbonate, and dibasic phosphate of sodium and with carbonate of ammonia.

* *Commerce Reports*, Feb. 3, 1920.

The yield of glycerin was increased to 12.7 per cent. but the alkaline mash was found to be an excellent breeding place for all kinds of acid-forming bacteria which would pollute the glycerin. This fault was remedied by the use of sodium sulphite which acts as a poison to the bacteria of lactic acid and others but does not, even in large quantities, affect the yeast cells (*Saccharomyces*). When sodium sulphite was employed as an antiseptic the yield of glycerin was increased proportionately to as much as 23 to 36.7 per cent. of the sugar.

The ordinary fermentation produces not only alcohol, carbonic acid, and glycerin, but also small quantities of acetaldehyde. When the sulphite is added in increasing quantities the yield of acetaldehyde and glycerin increases, while that of alcohol and carbonic acid decreases. The acetaldehyde was used largely for war purposes. The production of glycerin from sugar had a great practical value in war time, according to German writers. The manufacturing process, patented in 1915, was exploited on a large scale, and the production of glycerin exceeded 2,200,000 pounds a month. The invention also possesses an unusual theoretical interest as it shows how the transformation of materials by bacteria can be influenced by the addition of chemicals. In the words of a German writer (Prometheus, Nov. 1, 1919), "the biochemical processes open up new prospects for the future and seem to be destined to provide many substitutes to a people robbed of all raw materials."

Attempts made during the war in Austria-Hungary to produce glycerin from sugar do not seem to have met the success claimed for similar attempts in Germany. Complaint was made by the Bohemian journals of Prague that carloads of sugar had been wasted in recovering negligible quantities of glycerin, and doubts were expressed whether such waste of food could be justified even by the exigencies of war.

ANNUAL MEETING OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The Annual Meeting of the Philadelphia College of Pharmacy was held at the College March 29, 1920, at 3.00 P.M., the President. Howard B. French, presiding. Thirty-four members were present.

President French read his annual address. The address gave in detail the condition of the buildings, the work of the various de-

partments, the classification of the students as to numbers in the different courses of instruction and many items of interest in connection with the College work.

The following abstract from this interesting address covers special recommendations relating to the Centenary of the Founding of the College:

"Your President regrets that he cannot report success in obtaining a site upon the Parkway for your new buildings. The matter, however, is in the hands of the Park Commission and he hopes in the near future to be able to submit to them for their consideration, a sketch of the elevation for your buildings. He feels confident that provisions will be made in the very near future for the proper location of your College upon or adjacent to the Parkway.

"In about a year we shall be called upon to celebrate our 100th anniversary and it has been suggested at a conference of some of your members that an anniversary volume be issued shortly after the memorial exercises, which in the opinion of your President, should be in June, 1921, at the time of the annual commencement. In addition to the report of the exercises, it is thought that a complete historical account should be given concerning the College and its development—including photographs (so far as can be obtained) and sketches of those members who have taken an active part in the conduct of your institution from its origin in 1821 to the Centenary. A complete list of the graduates of the College, with short biographical sketches of all that it is possible to obtain should be published in this volume.

"This work, which will prove no small task, should be placed in charge of a proper Committee, which, with your sanction, should be appointed by your executive. The Committee should in his judgment be a combined College, Faculty and Alumni Committee.

"Your Board of Trustees have already placed themselves on record as favoring a certain type of building and placed the preparation of plans for the same in the hands of a committee.

"Efforts should also be made to use every means to secure funds for the development, maintenance and endowment of the institution. No better work could be placed in the hands of an active Alumni Committee, which should work in full accord with the Committee appointed by the authorization of your body.

"It is the wish of your Executive that at this meeting you authorize him to appoint such committees as in his judgment and

with the approval of your Board of Trustees, would prove efficient in carrying out the suggestions made above. He particularly asks that you authorize him to appoint an 'Executive Secretary of the Centenary Plan.' Such a secretary should be a person of energy and enthusiasm to whom could be entrusted the task of formulating the details of the comprehensive plan under the supervision and guidance of the existing Committee of the Board of Trustees."

Joseph W. England offered the following:

"*Resolved*, That a General Committee on the One-Hundredth Anniversary of the College, representing every pharmaceutical interest and every section of the country, and sub-committees of this General Committee, be appointed by the President; the chairmen of the various sub-committees to constitute an Executive Committee," which was, on motion, adopted.

Robert P. Fischelis offered the following resolutions:

"*Resolved*, That it is the sense of this meeting that the General Committee on Centenary, to be appointed in accordance with the resolution offered by Mr. England, shall consist of one hundred and include representatives of the Alumni, Faculty, Trustees and Members of the College, and shall be headed by the President of the College.

"*Resolved, further*, That ten members of this General Committee, residing in Philadelphia or within easy access of the City, be designated at once by the President as a 'Sub-Committee on Organization,' to work out a plan covering the various activities to be entered into and the manner in which they are to be handled in connection with the Centennial Celebration, and submit the same for approval at a special meeting of the College to be called for that purpose within one month."

This was amended "that the Executive Secretary be selected at once and be added to the Committee of Ten."

The resolutions were fully discussed by many of the members and unanimously adopted, and April 26, 1920, was fixed as the time for the special meeting of the College.

Report of the Committee on Publication was read by Prof. Charles H. LaWall and on motion the report was received and the recommendation of the Committee that the College appropriate the usual amount for the use of the AMERICAN JOURNAL OF PHARMACY for the year 1920 was adopted.

The following is a brief statement of the progress of the JOURNAL since 1917:

Increase in mailing list	132 per cent.
Increase in total revenue	99 " "
Increase in publication expenses	82 " "

The advanced cost of most everything has materially affected the printing trade, but it is hoped that the cost of publication has about reached its height.

Prof. LaWall stated that the estate of the late Prof. Henry Trimble had sent to the JOURNAL a complete set of the AMERICAN JOURNAL OF PHARMACY. On motion, the thanks of the College were tendered to Mrs. Trimble for the valuable donation.

The Editor, Mr. George M. Beringer, reported that Volume 91 of the JOURNAL had been completed, and the monthly numbers are being issued as promptly as the demoralized condition of the printing trade permitted. Volume 91 contained a variety of original contributions, editorials, abstracts, and reprints from current literature, the purpose being to recognize the needs and desires of each branch of pharmacy and the drug trade interests. The primary duty of journalism, in whatsoever field engaged, is to make the publication sound, representative, progressive and beneficial to the interests it professes to serve. In order to fulfil its obligations to pharmacy, the scope of the AMERICAN JOURNAL OF PHARMACY had to be broadened and its circle of influence widened. The JOURNAL must continue to be the torch-bearer that will illumine the path of advances and record the progress of pharmacy and the allied sciences. The JOURNAL is developing a policy and taking an active interest in all matters pharmaceutic and by so doing its usefulness to pharmacy is receiving more recognition and its influence is growing apace. In a marked way this is shown in the growth of the list of subscribers. The earnest and hearty coöperation of the Committee on Publication, business management and contributors is gratefully acknowledged and to these the thanks of the College must be accorded for making possible the continued success and prosperity of the JOURNAL.

Mr. George M. Beringer reported the death recently of M. Eugène Collin, of France, an honorary member of the College.

Committee on Necrology reported that but one active member of the College had died during the year—Mr. C. Carroll Meyer.

An appropriate obituary has been prepared by Prof. Frank X. Moerk and published.

Prof. Cook, for the Committee on Nominations, reported that the list of nominations for officers had been printed and sent to all the members.

Prof. F. P. Stroup, who had been acting as librarian *ad interim*, reported verbally that the library had been used more than in any similar length of time for many years.

President French read a communication from Prof. Charles H. LaWall in which he suggested that the Pennsylvania Pharmaceutical Association be invited to hold their meeting in 1921 in Philadelphia at the time the College was holding its Centenary celebration. He believed hundreds of the Alumni would come to the city then, attracted by the double event. In the discussion that followed the reading, it was suggested that other organizations should also be invited to hold their meetings about that time. The suggestion was favorably received, when, on motion, it was voted to tender to the Pennsylvania Pharmaceutical Association the use of the College to hold their meeting in 1921.

President French read the following communication:

Camden, N. J., March 24, 1920.

"MR. HOWARD B. FRENCH, *President*,
Philadelphia College of Pharmacy,
Philadelphia, Pa.

DEAR SIR:

The New Jersey Pharmaceutical Association have had engrossed and framed resolutions upon the death of Prof. Remington. They desire to present these to the College as a token of their esteem for the late professor.

I understand that the next quarterly meeting of the College will be on Monday afternoon, March 29. If it is agreeable to you I will be glad to present this memorial at that time on behalf of the New Jersey Association.

Yours truly,
(Signed) GEORGE M. BERINGER, JR."

Mr. Beringer, Jr., being present, was invited to the floor, and in very appropriate remarks, presented the resolutions to the College. On motion, the sincere thanks of the College were tendered the New Jersey Association for the gift.

Prof. Heber W. Youngken, Curator, reported that one of the conditions growing out of the prohibition laws was the necessity of having a bond executed because of the many alcoholic preparations in the College. The alcohol question is now settled and we are getting our quota of alcohol for scientific purposes.

Mrs. F. M. Apple presented a crude drug specimen case.

Prof. LaWall had secured a section of wood water pipe used in the city about 1820.

The Martindale herbarium was being cleaned. The herbariums are being numbered to correspond with the Martindale herbarium. Some changes have been made in the classification and other changes are in prospect.

As the result of the ballot taken, the following officers were elected:

President, Howard B. French.

First Vice-President, R. V. Mattison, M.D.

Second Vice-President, Joseph L. Lemberger.

Treasurer, Aubrey H. Weightman.

Corresponding Secretary, C. A. Weidemann, M.D.

Curator, Heber W. Youngken.

Editor, George M. Beringer.

Librarian, F. P. Stroup.

Trustees—C. Stanley French, George B. Evans, Ambrose Hunsberger, Warren H. Poley.

Committee on Pharmaceutical Meetings—C. B. Lowe, M.D., George M. Beringer, Charles H. LaWall, John K. Thum, Heber W. Youngken.

Publication Committee—Joseph W. England, Charles H. LaWall, George M. Beringer, John K. Thum, J. W. Sturmer, R. P. Fischelis, E. F. Cook.

The President made the following appointments:

Committee on By-Laws—George M. Beringer, Joseph W. England, C. A. Weidemann, M.D.

Delegates to the American Pharmaceutical Association—Charles H. LaWall, J. W. Sturmer, F. P. Stroup, E. Fullerton Cook, C. B. Lowe, F. X. Moerk, H. W. Youngken, John K. Thum.

Delegates to Pennsylvania Pharmaceutical Association—Charles H. LaWall, J. W. Sturmer, C. B. Lowe, E. Fullerton Cook, F. X. Moerk, O. W. Osterlund.

Delegates to the New Jersey Pharmaceutical Association—

George M. Beringer, Charles H. LaWall, J. W. Sturmer, C. B. Lowe, H. W. Youngken.

Delegates to the Delaware Pharmaceutical Association—A. W. Miller, H. J. Watson, S. Loraine Foster.

Delegates to the Conference of Pharmaceutical Faculties—Charles H. LaWall, J. W. Sturmer, F. P. Stroup, H. W. Youngken.

On motion of R. P. Fischelis, it was voted that the College send a congratulatory message to the New Jersey Pharmaceutical Association on the occasion of the celebration of its Fiftieth Anniversary this coming summer.

Dr. Wm. Duffield Robinson stated he had conversations with a number of physicians who were also graduates of the Philadelphia College of Pharmacy, and who were favorably impressed with the idea of the Centenary celebration, and he suggested the appointment of a Committee to consider organizing the physician-pharmacists into an alumni association for the purpose of aiding the College and contributing to the success of the Centenary celebration. After some discussion, Dr. Robinson moved that the President appoint a committee to consider such an organization. Seconded and so ordered.

A symposium on the Centenary celebration followed. Prof. E. F. Cook was the first speaker. He was very enthusiastic and optimistic over the project. He thought the Alumni Association would be very active. Groups in every organization could be utilized. He wanted to see the College heartily sustained as a leader in the science of pharmacy, as well as in practical work; the advanced courses recently introduced and the extension of research work were dominant factors in maintaining the standing of the College.

R. P. Fischelis mentioned the recent celebration of the 100th anniversary of Colgate University. They had an enthusiastic Alumni Association and one of great activity. Fifteen hundred of its three thousand graduates were present and had worked hard for the success of the celebration. It was an object lesson for us. Publicity work was needed to attract students, and the student cooperation was desirable, and that of many others, especially the help of the large manufacturing houses of the country, a number of whom had in their organizations graduates of the P. C. P.

Dr. P. S. Stout was in favor of the suggestion of Dr. Robinson. It would be one element of success in the Centenary campaign.

Dr. Stewart also approved of the suggestion of Dr. Robinson. It would give us a good deal of backing from our medical graduates.

Mr. McNeary thought it desirable for the officers and trustees of the College to enlist the coöperation of and secure contributions from those who are among our graduates who have become millionaires because of the influence on their lives and their great success in life their connection with the College has had.

Mr. George M. Beringer was glad we had gotten down to a definite plan of work. We had talked much previously, but from to-day we are going to get down to hard work. This celebration was not a local affair, it was a national, yes, even an international event. Let us make a big function of it.

Prof. LaWall suggested to get the American Pharmaceutical Association to meet here next year. This was very favorably received, and, on motion, it was

"Resolved to formally extend an invitation to the American Pharmaceutical Association to meet in Philadelphia in 1921 and join with us in celebrating the Centenary of the College."

Mr. Beringer, Jr., said this would practically be a celebration of the centenary of pharmaceutical education in this country, and he thought that the beginning of pharmacy in Philadelphia had not been as well understood as it should be.

Mr. French suggested that the New Jersey Pharmaceutical Association should also meet in Philadelphia in 1921.

Mr. Beringer had often hoped for a joint meeting with the Pennsylvania Pharmaceutical Association—he thought it would be appropriate to ask the New Jersey Association to meet about the time of the Centenary celebration and hold at least one of their meetings in the College. The suggestion was favorably received, and, on motion, was adopted.

Mr. R. T. Blackwood proposed extending an invitation to the National Association of Retail Druggists to meet in Philadelphia in 1921.

Prof. LaWall proposed inviting the Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy.

A member proposed inviting the Philadelphia Association of Retail Druggists to actively participate in the centennial events.

All of these propositions were adopted.

Prof. LaWall moved that a Publicity Committee be appointed. Seconded, approved and so ordered.

In conclusion, Mr. Cliffe moved that we take cognizance of all pharmaceutical organizations. Approved.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

NEWS ITEMS AND PERSONAL NOTES.

DRUG TRADE BOARD OF PUBLIC INFORMATION ORGANIZED.

Representatives from eight national pharmaceutical associations met at the Chemists' Club, New York City, March 8, 1920 and organized the Drug Trade Board of Public Information. The object of this organization is to supply the public press with information regarding the various branches of pharmacy and secure for the profession that recognition to which it is entitled at the hands of the public and which it is not now receiving. The meeting was the outgrowth of the plan submitted by the Committee on Federation of the American Pharmaceutical Association at the meeting of the latter last August. The associations represented and their representatives are as follows:

National Wholesale Druggists' Association, C. H. Waterbury and F. E. Holliday, Mr. Waterbury being the permanent representative.

National Asso. Boards of Phar., Jacob Diner.

Am. Conference Phar. Faculties, Edwin S. Newcomb.

Am. Asso. Pharmaceutical Chemists, H. Noonan.

Proprietary Asso. of America, E. F. Kemp.

Nat'l Asso. Retail Druggists, Samuel C. Henry.

American Pharmaceutical Asso., Robert P. Fischelis.

Dr. H. V. Arny, chairman of the sub-committee on organization of the American Pharmaceutical Association, called the meeting and presided until the committee was able to organize. A temporary organization was formed with C. H. Waterbury, chairman, and R. P. Fischelis, secretary and treasurer. This temporary organization will function until May 10, when another meeting will be held in Washington at which the constitution and by-laws will be adopted and plans for active work will be presented. Members of the Board are now at work in planning for future activities. Business is being

carried on by correspondence and it is felt that when the permanent organization is formed in May, American pharmacy will at last have an organization as representative as the Drug Trade Conference, which will act as the mouth-piece of pharmacy in relation to the general public.

THE PENNSYLVANIA BOARD OF PHARMACY.

Notice of Examinations.

Examinations for applicants desiring registration as Pharmacists, will be conducted in the Philadelphia College of Pharmacy, 145 North Tenth Street, Philadelphia, and the Pittsburgh College of Pharmacy, corner Pride and Bluff Streets, Pittsburgh, on Friday and Saturday, June 4 and 5, 1920.

Time and Place.

Pharmacist Examination.

Practical Pharmacy—Friday, June 4, 1920. Class No. 1, at 9 o'clock A.M.; Class No. 2, at 11 o'clock A.M.

Materia Medica—Friday afternoon, June 4, 1920, 2.30 to 6 o'clock.

Chemistry—Saturday morning, June 5, 1920, 9 to 12 o'clock.

Pharmacy—Saturday afternoon, June 5, 1920, 2 to 6 o'clock.

Assistant Pharmacist Examination.

Pharmaceutical Arithmetic, Posology, Toxicology—Saturday morning, June 7, 1920, 9.30 to 12 o'clock.

Pharmacy, Materia Medica—Saturday afternoon, June 5, 1920, 1.30 to 6 o'clock.

Assistant Pharmacist Examination—At the Pittsburgh College of Pharmacy, corner Pride and Bluff Streets, Pittsburgh, Pa., and the Philadelphia College of Pharmacy, 145 North Tenth Street, Philadelphia, Pa., on Saturday, June 5, 1920, 9.30 to 6 o'clock.

L. L. Walton, *Secretary*,
P. O. Box No. 265, Williamsport, Pa.

LEHN & FINK, INC., MOVE TO NEW HOMES.

Forty-five years ago, Lehn & Fink, Inc., was doing business in one floor, cellar and sub-cellar of a small building at 160 William Street, New York City. The firm soon had to seek larger quarters,

which were found at 128 William Street. This shortly became inadequate and the well-known Lehn & Fink Building at 120 William Street was erected. Laboratories and manufacturing plants were built in Brooklyn, N. Y.

Increased business had again overtaken Lehn & Fink, Inc. A site of 20 acres of land, located on two trunk line railroads at Bloomfield, N. J., with ideal motor-trucking facilities to New York and with convenient trolleys for Newark and other sections of New Jersey, was purchased when it became evident greatly augmented manufacturing facilities would soon be necessary.

Despite uncertain weather and building conditions, new, modern manufacturing plants and laboratories were put up on this site during the winter and early spring. All departments of the plant are now in full operation directed by experts. The whole organization at Bloomfield has been planned to facilitate a maximum production and many new time and labor saving devices have been installed.

Research and testing laboratories occupy a prominent place in the new buildings, and rigid inspection is maintained to insure the quality.

The buildings contain every comfort for employees—abundant sunshine on every floor, ample wash rooms, lunch rooms and thorough ventilation.

Power is supplied from dynamos driven by oil-burning boilers. The water comes from newly driven artesian wells. A machine shop and box factory complete the equipment designed to make these laboratories and manufacturing plants a self-sustaining unit.

A NEW MODERN BUILDING IN NEW YORK.

During the summer, Lehn & Fink's executive offices and stock rooms will be moved to the 170,000 square feet of floor space in a new steel and stone building at Greenwich, Morton and Barrow Streets, New York City.

P. C. P. STUDENTS VISIT THE H. K. MULFORD CO. LABORATORIES.

The Philadelphia College of Pharmacy class of 1920 were the guests of the H. K. Mulford Company, on the afternoon of March 18, and visited the Biological Laboratories at Glenolden, Delaware County, Pennsylvania.

Special train service of three coaches was provided, which were well filled—there being one hundred and seventy-five in the party. Souvenir programs were prepared for the occasion, and as the weather was ideal, the trip was a most enjoyable one. The expressions of appreciation were universal.

CURRENT LITERATURE.

SCIENTIFIC AND TECHNICAL ABSTRACTS.

DETECTION OF NICOTINE.—O. Tunmann (*Apoth. Zeit.*, 33, 485, 1918; through *Chem. Zeit. Rep.*, 43, 193, 1919).—A drop of the alkaloid solution is brought into contact with a small quantity of *p*-dimethylaminobenzaldehyde dissolved in a drop of concentrated hydrochloric acid. Nicotine yields a red coloration which soon changes to violet-red; the reaction may be obtained with as little as 0.2 Mgm. of nicotine. Pyridine, coniine, and the common alkaloids do not interfere with the test. With a cold saturated picric acid solution containing 10 per cent. of concentrated hydrochloric acid, 0.01 Mgm. of nicotine yields a distinct precipitate, while 0.003 to 0.005 Mgm. gives microscopic crystals (these appear in about two minutes); pure pyridine also gives crystals with this test, but no amorphous precipitate. (From *The Analyst*, December, 1919.)

DETECTION OF HYDROGEN CHLORIDE IN CHLOROFORM.—D. Vorlander (*Ber. Deut. Pharm. Ges.*, 28, 337, 1918; through *Chem. Zeit. Rep.*, 43, 193, 1919).—Ten Cc. of the chloroform are treated with a very small quantity (about 0.01 Mgm.) of powdered *p*-dimethylaminoazobenzene, if hydrogen chloride is present a violet-red coloration is obtained. In the absence of hydrogen chloride the chloroform is colored yellow. An excess of the reagent may mask the coloration given by very small traces of hydrogen chloride. The violet-red coloration is destroyed by free chlorine. (From *The Analyst*, December, 1919.)

ANALYSIS OF SACCHARIN.—O. Beyer (*Chem. Zeit.*, 43, 537–538, 1919).—As the result of an examination of methods which have been proposed for the estimation of saccharin, the author finds that only

two methods are useful: namely, Richmond and Hill's method (cf. *Analyst*, 43, 353, 1918), and the *Reichsgesundheitsamt* method. According to the latter method 0.5 to 0.7 Gm. of the sample is boiled for two hours under a reflux condenser with 20 Cc. of 20 per cent. sulphuric acid, the solution then cooled, diluted, rendered alkaline with sodium hydroxide, and distilled, the ammonia being collected and titrated in the usual way. When the melting-point of a sample of commercial saccharin falls below 220° C., it is advisable to estimate the amount of *p*-sulphaminobenzoic acid present. For this purpose, 1 Gm. of the sample is heated for two hours under a reflux condenser with 10 Cc. of hydrochloric acid (sp. gr. 1.124) and 10 Cc. of water; the solution (filtered if necessary) is evaporated to dryness on a steam-bath, the residue dissolved in 10 Cc. of hot water and the solution kept for at least twelve hours at a temperature below 10° C. The para acid separates out as crystals, which are collected, washed with a small quantity of cold water, dried at 100° C., and weighed. (From *The Analyst*, December, 1919.)

ESSENTIAL OIL FROM *Juniperus procera* GROWN AT NAIROBI.—A. F. Macculloch (*J. Soc. Chem. Ind.*, 38, 364-T, 1919).—The oil obtained by steam distillation of fine shavings of the wood of *Juniperus procera* grown at Nairobi, British East Africa, had the following characters: Sp. gr. 0.987 at 15.5° C. $[a]_{D_{20}} = -16°$, $[n]_{D_{25}} = 1.480$. The oil was miscible in all proportions with alcohol of 90 per cent. and over, soluble (1 : 60) in 70 per cent. alcohol. The amount of cedrol formed depended on the interval between the disintegration and distillation of the wood. After exposure of the wood for some weeks to a hot sun the distilled oil solidified to a mass of crystals. The oil obtained by distilling wood which had not been exposed to the sun after disintegration contained 38 per cent. of cedrol (m. p., 75.5° C.). (From *The Analyst*, December, 1919.)

OIL FROM SUMAC (*Rhus Glabra*).—H. W. Brubaker (*J. Ind. Eng. Chem.*, 11, 950, 1919).—The seeds separated from sumac berries yielded on extraction with ether 11.71 per cent. of fatty oil, the average characters of which were as follows: Sp. gr. at 15° C., 0.92577; $[n]_{D_{20}°}$ C., 1.4710; acid value, 0.9; acetyl value, 9.235; saponification value, 192.6; iodine value, 126.76; soluble fatty acids, 0.766; insoluble fatty acids, 93.54 per cent. The characters of the insoluble fatty acids were: M. p., 17° C.; solidifying pt., 6° C.;

$[n]_D$, 1.470; iodine value, 121.8. The oil is quite viscid at ordinary temperature, and has a mild odor; it possesses moderate drying properties, and compares favorably with other vegetable oils, such as cottonseed oil. It is applicable as an edible oil or as a material for soap making, or as a semi-drying oil for paints. It is estimated that 6 million lbs. of oil could be obtained annually from sumac seed in the State of Kansas. (From *The Analyst*, December, 1919.)

A NEW ESSENTIAL OIL.—Challinor, Cheel and Penfold describe in *J. Proc. Roy. Soc., N. S. W.* (52: 175, 1918), the essential oil obtained from the entire plant of a new species of *Leptospermum* (*L. citratum*). It is of a pale amber color and pleasant lemon-oil odor, sp. gr. at $\frac{15^\circ}{15^\circ}$ C., 0.8841; Opt. rotat. at 18.6° C., a_D + 3.6, refract. ind. at 20° C.; n_D 1.4730. It contains 90 per cent. of the aldehydes citronellol and citral in nearly equal proportions, and is soluble in two volumes of 70 per cent. alcohol (by weight). The identification of the two aldehydes was made by the approved methods. The non-aldehydic portion of the oil is still under examination, as the amount available is small. A small proportion of a phenolic substance seems to be present as a crystalline benzoate is produced by the action of benzoyl chloride. Color reactions with bromine and with hydrochloric acid indicate the presence of a small amount of aromadendrene. The data show that the oil is distinctive in character and differs from that of any other species of *Leptospermum* so far recorded. H. L.

BOTULISM.—The experiments reported on by Dickson and his associates were undertaken to determine the thermal death point of *B. botulinus* and its spores under various conditions. They found that the spores of *B. botulinus*, when mixed with animal and vegetable protein, are much more resistant to heat than has been believed. The acidification of the culture medium by the addition of 5 per cent. lemon juice does not prevent the growth of *B. botulinus* or the formation of its toxin, but the thermal death point of spores of *B. botulinus* is markedly lowered when they are heated in an acid medium of similar concentration. The addition of cane sugar to beef broth in concentration up to 64 per cent. does not prevent the growth of *B. botulinus* or the formation of its toxin, although it does inhibit both to a certain extent. Certain fruits which have been

canned in sugar form suitable mediums for the growth of *B. botulinus* and the development of its toxin. Peaches, apricots and pears were tested. Certain of the methods of canning are inefficient if the raw material happens to be contaminated with spores of *B. botulinus*. This is true of commercial canners' processes as well as of the home canning processes. (*Arch. Intern. Med.*, Chicago; through *J. Am. Med. Assoc.*, January 10, 1920.)

MODIFICATION OF BENZIDINE TEST FOR OCCULT BLOOD.—Gregersen has recently found that a frequent cause of failure in the application of the benzidine test is that too strong solutions of the reagent are used. Following Grundmann's idea, he reached the conclusion that many of the positive reactions in normal persons on a meatless diet may be explained by the fact that mineral traces of blood were mixed with the feces, which, because of the excessive sensitiveness of the reagent, produced positive reactions. Boas accepts the idea that the use of highly concentrated benzidine solution doses lead to false diagnosis, and on that account approves, after careful trials, Gregersen's modification of the test. Gregersen uses a 0.5 per cent. benzidine solution, and instead of the easily decomposable hydrogen dioxide he employs barium dioxide, which is much more stable. Gregersen's method is described in detail, and Boas offers what he considers a further slight improvement. Boas admits, however, that in using the weaker solution very slight hemorrhages, though worthy of note, might go undiscovered. (*Berliner klinische Woch.*; from *Jour. Amer. Med. Assoc.*, January 24, 1920.)

DETERMINATION OF FILICIC ACID.—Perrin (*Repertoire de Pharmacie*, No. 3, 1919) states that it is essential to determine the amount of filicic acid present in extract of male fern, as many an extract may have the required content of filicin, without containing a trace of filicic acid, the essentially active constituent. He employs the following method: to the crude filicin, in the weighed flask, obtained according to the directions given in the B. P., add 2 Cc. of amylic alcohol, allow the mixture to stand for twenty-four hours, well corked, shaking occasionally. Thereupon, drop by drop, 20 Cc. of pure methyl alcohol are added; the first drops produce a precipitate which redissolves; when the precipitate does not redissolve the remainder of the methyl alcohol may be added at once. Shake, let the mixture stand for twenty-four hours in a cool place; filter, wash

out the flask, then the filter, twice with 5 Cc. of methyl alcohol; allow the filter to dry; then place the filter and the flask in a cold oven and gently heat to 100°, allow them to remain at 100° for one hour; then weigh. The amount of filicic acid contained in the flask, *plus* the filicic acid on the filter multiplied by 25, gives the content of filicic acid in 100 grams of the extract; the amount should be from 3.5 to 9 per cent., according to the date of harvesting the male fern; while the content of filicin scarcely varies, the amount of filicic acid present is higher in autumn than in spring. (From *The Chemist and Druggist*, January 10, 1920.)

FRAUDULENT COCAINE.—Samples of a substance carefully packed in tins and labelled cocaine hydrochloride and sold on the German market have been found to consist of magnesium sulphate in unusually minute crystals which seem to have been especially prepared to perpetrate the fraud. (*The Pharm. Jour. and Pharmacist*, September 27, 1919.) J. F. C.

POISONING CROWS WITH STRYCHNINE.—Crows have become a serious menace to the almond crop in Klicktat County, Wash. Green almonds impregnated with strychnine (strychnine sulphate?) have been found very satisfactory in exterminating the birds. (*Weekly News Letter*, U. S. Dept. Agric., January 28, 1920.) J. F. C.

SIMPLIFIED METHOD FOR DETECTION AND ESTIMATION OF DISTRIBUTION OF MORPHINE.—The presence of morphine in food, or in tissues and body fluids, has been determined by Morgulis and Levine by heating with 2 per cent. tartaric acid (if solid, the material should first be ground or finely minced) to convert all morphine into the soluble tartrate. The mixture is rapidly cooled, preferably on ice, to solidify the fatty material The solid residue is removed by straining through cheese-cloth, and is washed until the washings are no longer acid to litmus. The liquid, after being filtered through paper, is evaporated to a pasty consistency. The tartrate is then decomposed by the addition of an excess of sodium bicarbonate which sets the alkaloid free. The evaporation is then continued to complete dryness, and the mass is powdered and extracted with chloroform to remove the free morphine. The volume of the chloroform extract is noted, and the smallest quantity of the

extract is found which, on evaporation (in a porcelain crucible over the water bath), leaves a residue which yields a definite morphine test. In this way the relative amount of morphine in several extracts can be determined. Besides knowing the limit of sensitivity of the reaction an approximate estimate of the amount of morphine in the original sample is possible. Inasmuch as the authors found that morphine, whether given subcutaneously or by mouth, is widely distributed throughout the animal body, finding its way into almost every tissue, they state, that it it is not advisable to limit the toxicologic examination for morphine to the alimentary tract alone, an examination of at least the kidney and urine and liver being indispensable. (From *Jour. of Lab. and Clinical Med., St. Louis*, 5: No. 5 (Feb. 1920); through *Jour. Amer. Med. Assoc.*, Mar. 27, 1920.)

BOTULISM.—Three different outbreaks of botulinus poisoning in Kiel within a year, which resulted in three deaths, induced Bitter to study into the question. The eating of salted herring caused the first of the three fatal cases. The herring had a typical rancid odor, and *Bacillus botulinus* was cultivated from two herring. Others fed to mice exerted a toxic effect. Too little vinegar had been used in preserving them, the pickle containing only 0.6 per cent. acetic acid. Experimentation showed that botulinus strains of various origin grew almost unchecked in nutrient agar containing up to 0.1 per cent. acetic acid. It was found, however, that a pickle containing 2 per cent. or more of acetic acid would prevent the development of poison from *B. botulinus*. It has also been shown that a 10 per cent. brine, such as is usually employed, will protect food preserved in it against the botulinus. The second outbreak in Kiel, comprising four cases, resulted from the eating of rancid-smelling raw ham. There were no fatalities, although the cases were typical and severe. In the third outbreak three persons were affected by eating salted herring, and two of these died. Bitter recommends that in the case of meat, fish and sausage poisoning all manifestations resembling botulism should be made reportable by law. He places the case mortality from botulinus poisoning in Germany at 16 per cent. Greater publicity should be given to the fact that if preserved vegetables and meats have a peculiar disagreeable odor, taste or appearance there is great danger in their consumption, and that if they are used, though they look suspicious,

they should be thoroughly cooked, though it is true that cooking sometimes fails to protect. As a rule, *B. botulinus* is found only in food carelessly preserved or stored in too warm a place. Bitter knows of only one instance in which *B. botulinus* has been isolated from other than damaged foods. Kempner and Pollock succeeded in isolating *B. botulinus* from the feces of pigs. (From *Deutsche medizinische Wochenschrift, Berlin*, 45: No. 47 (Nov. 20, 1919); through *Jour. Amer. Med. Assoc.*, Mar. 27, 1920.)

MICRO-ANALYSIS OF THE BLOOD.—Feigl suggests other lines in which Bang's micromethod can be instructively applied, with slight modifications, as in Ljungdahl's research on volatile substances in the blood. The latter uses capillary tubes for the weighing procedure, instead of Bang's paper, for determination of the acetone in the blood. This capillary technic has a certain number of advantages for research of different kinds in this line, especially for analysis of lipoids. Instead of Bang's paper, Feigl uses asbestos fibers. They take up the blood as well as the paper, and allow estimation of the ash and even of its separate elements. Extremely small quartz beakers with platinum loops, and platinum iridium beakers—eventually filled with loose quartz—also answer the same purpose. Another field for research is with microcolorimetry. Feigl has succeeded in this way with extracts from as little as 200 Mg. of blood. Determination of cholesterol is possible also with this technic. Picric acid reduction of sugar is another progress. In short, he concludes, "the reactive instrumental and theoretical possibilities of colorimetry and the wonderful nephelometric findings open prospects of applying Bang's fundamental principle in untried fields which promise great progress." (Nephelometry is the method of analysis by measuring the brightness of light reflected by particles in suspension in a tube.) (From *Zentralblatt für innere Medizin, Leipzig*, 41: No. 2 (Jan. 10, 1920); through *Jour. Amer. Med. Assoc.*, Mar. 27, 1920.)

ADULTERATION OF ORIGANUM MAJORANA.—*Origanum Majorana* is characterized by numerous multicellular hairs mostly curved and usually finely warty. *Thymus serpyllum* has but few multicellular hairs; distinctive for this plant are the very short tooth-like hairs on the margin of the leaf. *T. vulgaris* has numerous short, one-celled, minutely warty hairs, and also two-celled hairs with a bent

terminal cell. The powdered leaves of *O. majorana* have been adulterated with the two last-named, and as they are difficult to distinguish, the above characters may be useful. (Griebel and Schaefer, *Pharm Ztg.*, 64: p. 784; through *The Pharm Jour. & Pharm.*, Mar. 6, 1920.)

Active Principles of Pituitary Gland.—A method of preparing crystalline residues, very active physiologically, from extracts of the posterior lobe of the pituitary gland is described by Dudley. It consists in extraction of the dried and powdered infundibulum with acidulated water, treatment of the solution with colloidal ferric hydroxide and subsequent continuous extraction of the filtrate with butyl alcohol at reduced pressure. This extract yields a crystalline residue which contains all the uterine stimulant, together with some of the pressor principle and contaminating substances. Dudley claims the uterine stimulant and histamin are not indentical, as suggested by Abel and Kubota, but are two distinct chemical substances. The only point of similarity observed is that both are readily extracted from alkaline solution by butyl alcohol. The pituitary uterine stimulant is more readily extracted from acid solution than the pressor principle. (From *Jour. Pharmacology and Exper. Therapeutics, Baltimore;* through *Jour. Amer. Med. Assoc.*, March 6, 1920.)

Anthelmintic Action of Benzyl Alcohol and Benzyl Esters.—Experiments were made by Macht on both earthworms and roundworms of the pig with benzyl alcohol, benzaldehyde, benzyl acetate and benzyl benzoate. It was found that all of these drugs exerted a toxic effect on the worms but not in the same degree. The least effective was benzyl benzoate. Its weak action, however, must be for the most part due to its poor solubility and penetrating power. Benzyl alcohol was found to be the most powerful anthelmintic of the drugs studied. A 0.5 per cent. solution of it, and even weaker solutions, killed earthworms rapidly. Benzaldehyde came next in its efficiency and benzyl acetate was third. (From *Jour. Pharmacology and Exper. Therapeutics, Baltimore;* through *Jour. Amer. Med. Assoc.*, March 6, 1920.)

Toxicology of Hydrocyanic Acid.—Chelle reports experimental research which demonstrated that hydrocyanic acid and the alkaline cyanides become transformed under the influence of putre-

faction processes into sulphocyanic acid. This is reversible under the action of a suitable oxidizer. After the death of a dog that had died ten minutes after taking 20 Cc. of a 1 per cent. solution of potassium cyanide, the organs were examined for hydrocyanic acid the second hour, and the eighth and thirteenth day. It had all disappeared, having become transformed to sulphocyanic acid, but it was easily transformed back again. This may prove useful in suspected cases of hydrocyanic poisoning. (From *Jour. de Medecine de Bordeaux;* through *Jour. Amer. Med. Assoc.*, March 6, 1920.)

BOOK REVIEWS.

Transactions of the College of Physicians of Philadelphia for the Year of 1918.

This is an interesting work containing twenty-one papers read before the members of the College of Physicians, and also the *Proceedings* of the Sections on Ophthalmology and Industrial Medicine and Health. An interesting paper is by Dr. Victor G. Heiser, member of the American Red Cross Commission to Italy, on "Some of the Accomplishments of the Italian Medical Men in the War."

To those who know Italy largely through the poor immigrants coming to this country, this account of the completeness and high efficiency of the Medical Corps of the Italian Army will be a surprise, in fact the medical corps of our own army could possibly learn much from this report. Some idea of the magnitude of work performed is shown by the fact that the hospital service of Italy expanded in two years to 1,000,000 beds, while in the whole of our own country are only 300,000 beds. The location of some of the military hospitals was an object of interest, one was located at the very front, thirty to forty feet underground. It was supplied with artificial ventilation and modern hospital furniture, with wards and a good operating room. Another was 6,000 feet above the level of the sea, hewn out of the side of a cliff, it contained thirty beds. After emergency treatment the soldiers were forwarded to the railroad by carriages suspended from wire cables passing over chasms thousands of feet deep. The improvement in lung surgery in the Italian Army has been marvellous, a leading officer thought it possible to keep down the mortality from gunshot wounds of the chest to 5 per cent.

Dr. James M. Anders has given a very interesting memoir of Dr. Samuel Gibson Dixon who filled so brilliantly for twleve years the position of Health Commissioner for the State of Pennsylvania. He organized the department, having been appointed the first commissioner by Governor Pennypacker, who was well acquainted with his ability.

At the time of his appointment he was President of the Academy of Natural Sciences which office he held for twenty-one years. Possessed of an excellent education acquired both in this country and in Europe, he was well qualified for this new position.

To give an idea of his unceasing efforts in behalf of public health we mention the following bureaus into which the department was organized: Bureau of Vital Statistics, also that of Medical Inspection; Sanitary Engineering; Division of Laboratories; Distribution of Biological Products; Accounting and Purchase of Supplies; Tuberculosis Dispensaries and Sanatoria; Bureau of Housing; The Division of Public Service, the Control of Narcotics; and that of Child Hygiene, and lastly a Division for the treatment of Social Diseases.

Much of Dr. Dixon's best energies and closest supervision was devoted to the organization and planning of the tuberculosis work of the state. Dr. Chas. W. Burr has furnished a most interesting biography of Jean Paul Marat, physician, revolutionist and paranoic. He was one of the three monsters (Marat, Robespierre and Danton), who incited and pushed the French Revolution in such a heartless manner, shedding the blood of many of the bravest and ablest sons and daughters of France. "Marat wanted to be a leader. He believed he could rule the country if only enough people were killed. He was shrewd enough to know that if he shouted long enough and loud enough that he was the people's friend, that many would believe and follow him.

"His creed was simple, all that the rich own belongs to the poor because they stole if from the poor. His theory of government was equally simple. If you don't agree with me you are not a patriot, if you are not a patriot the proper punishment is death. Therefore we will kill everybody who disagrees with us and then we will have the millenium, the brotherhood of man." He came to an end, none too soon, by the dagger of Charlotte Corday for he had caused France to wade through rivers of blood.

This volume is a book of 300 pages, well printed and bound, a credit to the College of Physicians. C. B. Lowe, M.D.

SOUTH CHINA CAMPHOR TRADE.*

By Consul General Geo. E. Anderson, Hongkong, Dec. 12, 1919.

The interesting demand from the United States for supplies of camphor from South China is leading to a very marked activity on the part of all interests concerned in the trade and there is every indication that there will be a very large development in the volume of the output from both Kwangtung and Fukien Provinces, where there has always been more or less activity in camphor production when there has been a favorable market, and also in Kwangsi Province, where the production heretofore has been of less importance.

The government officials of Kwangsi Province at Kuelin have organized a company for the exploitation of the industry and have established a factory at that provincial capital with a view to eventually placing the industry on a modern basis by the introduction of modern methods, although for the time being the gum is being distilled by the old Chinese processes which give an impure product and are wasteful. In other respects the production and export of the gum are being organized in an effective way.

Exports of Camphor to United States—Camphor Oil.—The export of the gum from Hongkong is continuing on a large scale. Exports to the United States during the month of November amounted to 164,575 pounds valued at $309,719, and the total exports to the United States for the year to date are valued at $1,844,391. An effort is now being made by buyers representing American concerns to establish a trade in camphor oil, which usually contains about 60 per cent. of pure camphor, as well as other valuable constituents. Camphor oil is already being exported in a considerable volume from the Kwangtung, Fukien and Kiangsi field by way of Kiukiang and the Yangtze valley. It is exported in cases containing two old kerosene tins, which hold about 65 pounds to the case. The oil, as well as camphor, in the northern field, has been controlled to a greater or less extent by Japanese firms heretofore.

Native reports indicate that the best untouched camphor tree field in China is in Kiangsi Province, though the trees in Kwangsi Province have been cut out comparatively little. Great interest has been shown by a number of investigators in the island of Hainan, where the possibilities of camphor production, both from indigenous trees and from planted groves, are being looked into.

* From *Commerce Reports*, Feb. 11, 1920.